JOINT USE OF POLES

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1. SCOPE

1.1 This section discusses considerations involved in joint use of poles for rural power and telephone circuits under conditions where:

1.11 Telephone circuits are open-wire.

1.12 Electric power circuits are of the multigrounded neutral type whose voltage to ground does not exceed 8700 volts.

1.2 For joint use in situations not covered by 1.1, special study of the factors involved will be required to determine the necessary clearances, separations, and protection arrangements. Among conditions not covered in this section are those where:

1.21 Telephone circuits are in cable.

1.22 Electric power circuits are of the delta, unigrounded neutral or ground return type.

1.23 Electric power circuits are of the multigrounded neutral type but where voltage to ground exceeds 8700 volts.

1.3 For the conditions described in 1.1, this section provides information on requirements for clearances, separations, pole strengths, and protection, together with guides for determination of classes and heights of poles for typical conditions encountered in the field.

2. GENERAL

2.1 Joint use of poles in rural areas offers opportunities for economies in the construction of pole lines for providing telephone and electric service. The maximum economies are associated with pole lines constructed expressly for joint use. Where joint use is to be undertaken on an existing electric pole line, which represents the majority of situations that will be encountered, the economies available, if any, will be in inverse proportion to the extent that modifications in the pole line are required to make it suitable for joint use. The modifications required are determined by the necessity of providing adequate pole strength, proper ground clearance and conductor separations to assure safety in the operation of telephone circuits in close proximity to power circuits.

2.2 The requirements of this section of the manual are based on conformity with applicable provisions of the National Electrical Safety Code (NESC) Fifth Edition. The provisions of NESC form the bases of the publication "Joint Pole Practices for Supply and Communication Circuits" of the Edison Electric Institute (Pub. M-12) and the Bell Telephone System.

2.21 Because the NESC did not cover joint use in long-span construction, additional provisions are necessary to assure adequate separation in mid spans. Requirements governing long-span joint use were issued by the EEI and Bell System in 1946 as part 5 of the "Joint Pole Practices" mentioned in paragraph 2.2. Experience with the practices outlined in part 5 has been satisfactory and forms the basis for the requirements of this section for long-span construction.

2.3 In addition to the provisions of the NESC, all joint construction should be in conformance with state and local laws or ordinances applying, where they may be more stringent than the NESC. Since joint construction will involve attachments to poles owned by a power organization, the provisions of specifications, if any, of the owner of the poles to which

with power circuits. Therefore, requirements for vertical clearances above ground for telephone conductors will control the pole height requirements in joint use. Section 602 of the Telephone Engineering and Construction Manual provides data on ground clearance requirements which should be followed in the design of joint use pole lines.

4.3 Separation Between Electric and Telephone Circuits

4.31 The National Electrical Safety Code has established minimum separations between electric and telephone circuits at the support and in the span. For long span construction, additional requirements have been established to provide additional safeguards against contacts under storm loading conditions and during wire stringing operations.

4.32 The minimum separation requirements for long-span construction are outlined in paragraphs 4.33 through 4.37 below and are illustrated in figures 1 and 2.

4.33 The point of attachment of the telephone conductors at supports is determined by consideration of the separation requirements listed in paragraphs 4.34 through 4.36. The greatest separation required to conform to the requirements of any one of the paragraphs is the separation that must be used.

4.34 The minimum vertical separation between power and telephone conductors at the pole and in the span where the voltage between the power conductors is 8700 volts or less is 40 inches at the pole and 30 inches in the span. (NESC Rule 238A.) For supply conductors over 8700 volts these distances are 60 and 45 inches, respectively. All voltages are the highest voltage between power conductors.

Note: Multigrounded neutral conductors are classified as 0-750 volt conductors when associated with power circuits whose voltages are 15,000 volts or less.

4.35 The minimum vertical separation at the pole of paragraph 4.34 shall be so adjusted that under conditions of 60° F. no wind and final unloaded sag, no supply conductor of 0 to 750 volts (secondary conductors), shall be lower at any point in the span than a straight line (line of sight) joining the points of support of the highest communication conductor on adjacent poles. No supply conductor of more than 750 volts (primary conductors) shall be lower at any

point in the span than 30 inches above such line of sight.

4.36 An exception to 4.35 is made in the case where the supply circuit utilizes a multigrounded neutral conductor at a lower position than primary and secondary conductors. In this situation the line of sight rule of 4.35 does not apply to separation from the neutral conductors. The separation required by 4.34 (40 inches at the pole and 30 inches in the span) does apply to the neutral conductor but the provisions of paragraph 4.35 for phase wire and secondaries must also be met.

4.37 The minimum vertical separation at supports between telephone conductors and power system equipment such as transformers is 40 inches.

5. CLIMBING SPACE REQUIREMENTS

5.1 Since telephone attachments will always be made below the power conductors, the climbing space requirements of this paragraph apply only to telephone attachments.

5.2 A climbing space of at least 30 inches square measured horizontally should be provided past any telephone conductors, crossarms or other attachments. The climbing space shall extend at least 40 inches vertically above and below the point of attachment. (NESC Rule 236E.)

6. ELECTRICAL PROTECTION REQUIREMENTS

6.1 The requirements of this section are based on the use of coordinated electrical protection schemes on the power and telephone systems. Coordinated electrical protection is obtained where:

6.11 The power and telephone circuits are so constructed, operated and maintained that the power circuits will be promptly de-energized, both initially and following subsequent circuit breaker operation, in the event of a contact with the telephone plant.

6.12 The voltage and current impressed on the communication plant in the event of a contact are not in excess of the safe operating limit of the telephone system protective devices.

6.2 The protection arrangements called for in section 805 and section 820 of the Telephone Engineering and Construction Manual provide a means of achieving the requirements of

paragraphs 6.11 and 6.12 above and these arrangements should be used in all joint use construction. These arrangements can be summarized as follows:

6.21 Provision of approved type of station protectors at each subscriber station grounded, if possible, to the multigrounded neutral.

6.22 The use of power contact protectors at the intervals specified in section 820 and inter-connection of the ground lead of the protector in the multigrounded neutral of the power system.

6.23 The use of drainage units at proper intervals to reduce induced voltages to safe operating values.

7. INDUCTIVE COORDINATION CONSIDERATIONS

7.1 Inductive interference with telephone circuits by paralleling power circuits is discussed in section 691 of the manual.

7.2 Joint use of poles for power and telephone circuits does not increase materially the noise induction considerations involved with parallels at roadway separations, if care is taken to provide and maintain uniformity of wire separations including avoidance of sag inequalities. The decreased separation obtained in joint use necessarily provides more severe coupling conditions than roadway separation. This is somewhat offset by the improved configuration obtained and the more uniform separation.

7.3 REA construction standards for joint use have been designed to minimize induced noise and, if followed, will result in satisfactory operation in the usual situation.

8. ECONOMIC CONSIDERATIONS

8.1 The primary purpose of utilizing joint poles for rendering power and telephone service is economic. In some instances, joint use may be desirable to solve right-of-way difficulties or structural conflicts irrespective of economies. Joint pole lines are often preferred over two separate pole lines where the pole lines will cross over cultivated farm lands.

8.2 The determination of economies in joint use is discussed in detail in REA Bulletin 305-1 and the methods of determining rental payments, form of agreement for Joint Use, etc., are also covered in this bulletin. This bulletin should be consulted prior to undertaking joint use arrangements.

8.3 In the usual case, a new pole line constructed expressly for joint use nearly always will afford economies. Because of the prevalence of electric service throughout rural areas at this time, however, few opportunities will be available to obtain joint use under this most favorable condition.

8.4 The normal situation that will be encountered is where an existing electric pole line requires modification to make it suitable for joint use. To a large degree, the extent to which joint use in such situations is economical will be determined by the costs of the modifications required. This is primarily a function of pole replacements involved. Paragraph 10 provides a method of estimating pole replacements for clearance or strength reasons in a given situation. This determination, together with the guidance provided in REA Bulletin 305-1, can be used to ascertain whether or not joint use is an economical choice for particular line routes.

9 SAFETY CONSIDERATIONS

9.1 The separation, protection and strength requirements outlined in this section are designed to provide safety to life and property under joint use conditions. Experience has shown that conformance with these requirements results in a high degree of safety. None of these requirements can reduce the hazards associated with careless construction practices during wire stringing operations.

9.2 Since most joint use will be attained on an existing electric pole line, the telephone wire will necessarily be strung under energized power conductors.

9.3 Under such conditions, adequate precautions must be taken to:

9.31 Prevent telephone wires from coming into contact with energized power conductors.

9.32 Prevent injury to workmen in the event such contact does occur.

9.4 To achieve the objective of 9.31 requires that the wire be strung with great care and that the pulling tensions be kept low and applied evenly so that the line wires do not tend to swing upward sufficiently to make contact. Relatively short sections of line should be handled at one time. Rollers should be employed at angle points. Observers should be placed at critical points to control the wire stringing. All other precautions generally associated with wire stringing should be employed.

9.5 To achieve the objective of 9.32 requires that all personnel handling wire wear rubber gloves tested for 20,000 volts

breakdown. The equipment holding the wire reels should be bonded to the multigrounded neutral of the power system. Each line wire should be tied into the multigrounded neutral before tensioning operations begin. All phases of the operation should be worked out on the basis that the telephone wire is an energized conductor.

10. DETERMINATION OF POLE REPLACEMENTS REQUIRED ON EXISTING ELECTRIC POLE LINES

10.1 General: In order to determine whether an existing electric pole line can be utilized to support additional telephone conductors, consideration must be given to several factors. The poles must have sufficient strength to support the additional load and be of sufficient height to permit the required separation to be observed at the pole and in midspan between power and telephone conductors and to provide required ground clearances under telephone conductors in the section of line under consideration.

10.2 Conductor Separation at the Pole: The separation required between power conductors and telephone conductors is an important element to be considered in making a determination as to the suitability of the power line for joint use. For this purpose, a set of tables (RD-Fig. Nos. 18 through 53) is provided to indicate the required separations at the pole between such conductors. The following factors were taken into consideration in the preparation of these tables as well as the minimum separations stated in paragraphs 4.33 through 4.36:

10.21 Pole head configurations of power conductors were assumed to conform to those shown on RD-Fig. No. 16, attached.

10.22 Separations in these tables do not consider transformers or other power equipment that may be mounted below the neutral. The proper separation from such items should be checked in each individual case. See paragraph 4.37.

10.3 Method of Determining Separation: Since it is more desirable to maintain a uniform separation between the power and telephone conductors throughout the section of line than to maintain a uniform clearance of the telephone conductors above ground, the matter of determining pole replacements should be approached from that standpoint. The following method is suggested for determining the separation to be used:

10.31 Obtain from the power organization as much information as possible in regard to the section of line under consideration including staking sheets whenever available.

10.32 Determine pole head configurations showing relative positions of phase wires, neutral, secondaries, and transformers or other power line pole attachments.

10.33 Determine type and gauge of power conductors used.

10.34 Determine ruling span, actual spans, and basic pole height use in the power line.

10.35 Determine the applicable loading district for the section of line under consideration.

10.36 Based on the determinations made above, the applicable separation table should be selected (See RD-Fig. Nos. 18 through 53).

10.37 Generally the longest span in the joint use section will dictate the maximum separation that will be required, in some instances, however, a shorter span with underbuilt secondary conductors may require a greater separation. In the ideal situation, this maximum separation would be used throughout the section. A check of the pole line, however, would be necessary to determine if sufficient ground clearance can be maintained throughout the section without excessive pole replacements or additions. As a compromise between a uniform separation and pole replacements, it may be necessary to select a lesser separation that would be adequate for a large majority of the spans and to vary the separation in a relatively few spans in order to prevent excessive pole replacements or additions.

The actual determination of the separation to use is made from a joint consideration of providing uniform separation as nearly as practicable and still provide the necessary ground clearance under the telephone conductor with a minimum of pole changes. A preliminary determination can be made from the staking sheets of the power line and then field checked for proper ground clearance requirements.

10.4 Staking Curves: The attached staking curves, RD-Fig. Nos. 54 through 62 were prepared to facilitate checking of existing pole lines from a clearance standpoint. The following factors

were taken into consideration in the preparation of these curves:

10.41 Manufacturers recommended stringing sags for telephone conductors, by loading districts.

10.42 Telephone conductors were assumed to be maintained at the initial unloaded sags used in stringing.

10.43 Incremental increase in ground clearance requirements of one inch for each 10 feet of span beyond the basic span for the various loading districts.

10.44 Separations at the pole of from 4 to 12 feet in 2 foot intervals, between power line neutral and nearest telephone conductor.

10.45 Standard REA power line pole-head configuration with the neutral conductor attached 21.0 feet (for 30-foot poles) and 25.5 feet (for 35-foot poles) above ground.

10.5 The following procedure is suggested for determining the suitability for joint use of existing power line poles from a clearance standpoint:

10.51 Based on the required separation at the pole determined in paragraph 10.37, the height of poles involved, the type and grade of telephone conductor involved, and the applicable loading district, the appropriate staking curves (See RD-Fig. Nos. 54 through 62) should be selected and the acceptability for joint use of an existing pole line may be determined. The following examples are provided:

Example No. 1

Conditions:

Telephone Conductor	.102 30% EHS, Copperweld
Loading District	Heavy
Basic Ground Clearance	8 feet
Span Length	390 feet
Ground under span	Level
Power pole height	30 feet
Conductor separation at pole	8 feet

Solution:

Step 1: Select chart RD-Fig. No. 54
Step 2: Select column for 8 foot basic ground clearance
Step 3: In above column, locate 8 foot conductor separation
Step 4: Locate curve indicated by arrow
Step 5: Follow curve to point of intersection with "zero" line for a 30 foot pole
Step 6: Drop down vertically from this point to the horizontal scale and read the maximum permissible span length. (Note: In this instance the permissible span length is 398 feet. Since this exceeds the 390 feet established under "conditions," sufficient ground clearance will be available).

Example No. 2

Conditions:

Telephone Conductor	.102 30% EHS, Copperweld
Loading District	Heavy
Basic Ground Clearance	8 feet
Span Length	300 feet
Ground under span	2-foot ridge (midspan)
Power pole height	30 feet
Conductor separation at pole	8 feet

Solution:

Step 1: Select chart RD-Fig. No. 54
Step 2: Select column for 8 foot basic ground clearance
Step 3: In above column, locate 8 foot conductor separation
Step 4: Locate curve indicated by arrow
Step 5: Follow curve to point of intersection with horizontal line representing a 2-foot ridge for a 30 foot pole
Step 6: Drop down vertically from this point to the horizontal scale and read the maximum permissible span length. (Note: In this instance, the permissible span length is 310 feet. Since this exceeds the 300 feet established under "conditions," sufficient ground clearance will be available).

Example No. 3

Condition:

Telephone Conductor	.102 30% EHS, Copperweld
Loading District	Heavy
Basic Ground Clearance	10 feet
Span Length	450 feet
Ground under span	3-foot depression (midspan)
Power pole height	35 feet
Conductor separation at pole	12 feet

Solution:

Step 1: Select chart RD-Fig. No. 54
Step 2: Select column for 10 foot basic ground clearance
Step 3: In above column, locate 12 foot conductor separation
Step 4: Locate curve indicated by arrow
Step 5: Follow curve to point of intersection with horizontal line representing a 3-foot depression for a 35-foot pole.
Step 6: Drop down vertically from this point to the horizontal scale and read the maximum permissible span length. (Note: In this instance, the permissible span length is 458 feet. Since this exceeds the 450 feet established under "conditions," sufficient ground clearance will be available).

10.6 Pole Strength Requirements: In considering joint use on existing electric pole lines, a determination should be made of the number of poles which will require replacement because of insufficient pole strength. The attached charts (See RD-Fig. Nos. 1 through 15), have been prepared to show the maximum permissible span lengths for various classes of poles when considered for joint use of telephone conductors on single-phase (two wire) and three-phase (four wire) power lines. In the preparation of the attached charts, consideration was given to the following:

10.61 Pole Strength calculations were based on a margin of strength of 2.

10.62 Power lines were assumed to be REA-type pole-head configurations as indicated on sketch RD-Fig. No. 16, attached.

10.63 Average power conductor diameters of .400 inches, .350 inches, .300 inches, .250 inches, and .200 inches were assumed in order to simplify calculations.

10.64 Telephone conductors were assumed to be carried on a single crossarm located below the power neutral conductor and with separations from the power neutral as indicated on the charts.

10.65 An average diameter of .110 inches was assumed to be representative for the several types of conductors commonly used in REA telephone system construction.

10.66 Ice and wind loads on conductors and poles as established in the National Electrical Safety Code were considered for each of the three Loading Districts.

10.7 The following procedure is suggested for determining the suitability, for joint use, of existing power line poles from a strength standpoint:

10.71 Determine the number and diameter of the power conductors (phase wires and neutral) involved in the section of pole line under consideration.

(Notes: 1. See RD-Fig. No. 17 for diameters of conductors commonly used in REA power line construction.

2. Spans with underbuilt secondaries will require individual study. (See paragraph 10.76).

10.72 Determine the required separation at the pole between power and telephone conductors (See paragraph 10.3).

10.73 Determine the number of telephone conductors proposed in the section of pole line under consideration.

10.74 Determine the applicable loading district for the section of pole line under consideration.

10.75 Based on the determinations made above, the applicable pole strength chart should be selected. A determination of the poles requiring replacement for strength reasons can then be readily made by comparing the actual spans involved with the maximum permissible span for the class of pole involved.

10.76 When underbuilt secondaries are present in a span, the pole class required for that particular span may be checked by considering two additional primary conductors in the span. For example, if a single-phase two-conductor power line is being considered for joint use with two telephone conductors, and in one particular span one or two secondary conductors are in place, the class of pole required for four power conductors and two telephone conductors would be adequate.

(Note: When using this method, if the indicated class of pole falls within the beginning of a higher class pole, a more exact calculation of the class of pole required should be made to avoid unnecessarily changing out a pole.)

10.77 For spans requiring a higher grade of construction than that provided by a margin of strength of 2, an approximation of the maximum permissible span for any class of pole can be made by reducing the maximum span indicated for the class of pole involved by the ratio of 2 to the higher factor required.

10.78 The results of this study will indicate the frequency of pole replacements for strength reasons. These replacements should be combined with pole replacements required for clearance reasons (See paragraph 10.5) to determine the effects on economies of joint use. It is important to keep in mind that some poles replaced for strength reasons might also have to be replaced for clearance reasons. The total pole replacements, therefore, will not necessarily be the sum of the two, but a lesser figure.

(Note: Where the pole replacements or additions exceed an average of 2 per mile of line, the economics of joint use should be carefully reviewed.)

11. STAKING OF JOINT USE LINES

11.1 It is assumed in these paragraphs that the power line is already constructed and staking sheets are being prepared to cover the addition of telephone plant to these poles. The construction of new joint use lines poses a different staking problem in that the staking of poles would be adapted to fit both the telephone and power conductors. In the case at hand, the line was staked to fit the power conductors and the telephone wires must now be fitted to these existing poles.

11.2 Separations and Clearances

11.21 The separation between the multigrounded neutral and the point of attachment of the telephone crossarm has been determined in accordance with paragraph 10.37 based on the section of line under consideration. This same separation should be maintained at every pole if possible. If this is not possible in some spans due to insufficient clearance above the ground, the separation between the multigrounded neutral and the telephone crossarm may be reduced sufficiently to obtain the necessary ground clearance in those spans. In no event should the separation be reduced to the point where less separation is obtained than is specified in paragraphs 4.34 through 4.37.

11.22 The staking engineer must examine each span and test for ground clearance using the previously determined separation. This is done by checking the span against the Staking Curves (RD-Fig. No. 54 through RD-Fig. No. 62) for the particular telephone conductor, pole height and storm loading district involved. (See examples in paragraph 10.51.) If the ground clearance is adequate, the engineer indicates on the staking sheet the point at which the telephone crossarm should be attached. If the ground clearance is not adequate, the engineer determines at what additional height the attachment would have to be made in order to provide ground clearance. He must then check to determine the adequacy of this reduced separation from the multigrounded neutral. This is done by checking the minimum separation required for the type of telephone conductor, type of power conductor, ruling span, actual span and storm loading district involved (RD-Fig. No. 18 through RD-Fig. No. 53.) If the separation needed to give sufficient ground clearance is less than the minimum, rearrangement of the power line equipment or installation of a higher pole will be required at that point.

11.3 Joint Use Pole Top Assembly Units

The pole top assembly units and wire support units described briefly in the following paragraphs with recommendations as to their application to joint use construction are described in detail in section 625 of the Telephone Engineering and Construction Manual with appropriate ratings as to the loads which these units will safely support. These units and other units which are to be used in joint use construction must be prefixed with the letter "N" in accordance with the instructions relating to joint use in the "Telephone System Construction Contract."

11.31 Unit PB1-4 - This is a 30" two-pin crossarm mounted as an extension arm and supported by a 30" wooden crossarm brace to carry two telephone wires on one side of the pole. This method of attachment was chosen in order to leave the other side of the pole clear to meet climbing space requirements and to provide horizontal configuration of the telephone conductors for transposition and inductive coordination reasons. This unit is used in conjunction with a T-1 or T-2 unit for tangent and angle pole construction.

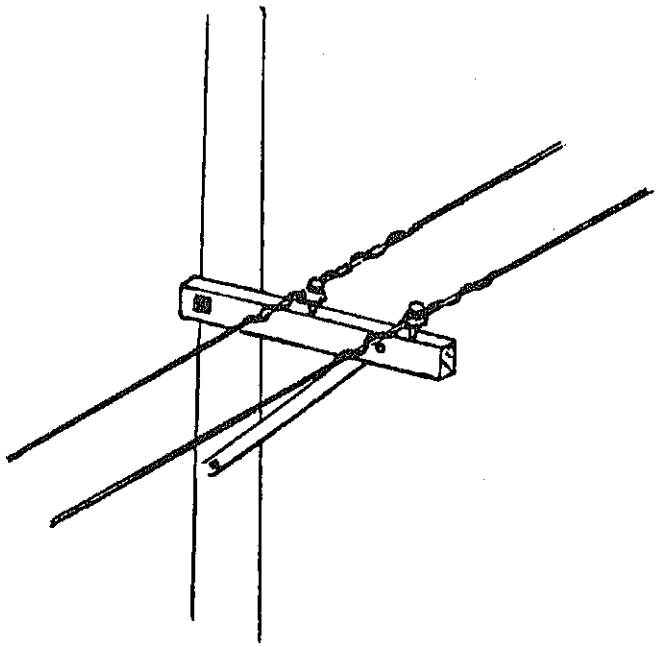


Figure 4 - PB1-4 Unit

11.32 Unit PB1-1 - This is an 18" two-pin crossarm mounted on the pole in line with the telephone wires. It is used with a T-3 unit to achieve a tandem transposition in tangent construction and at small angles.

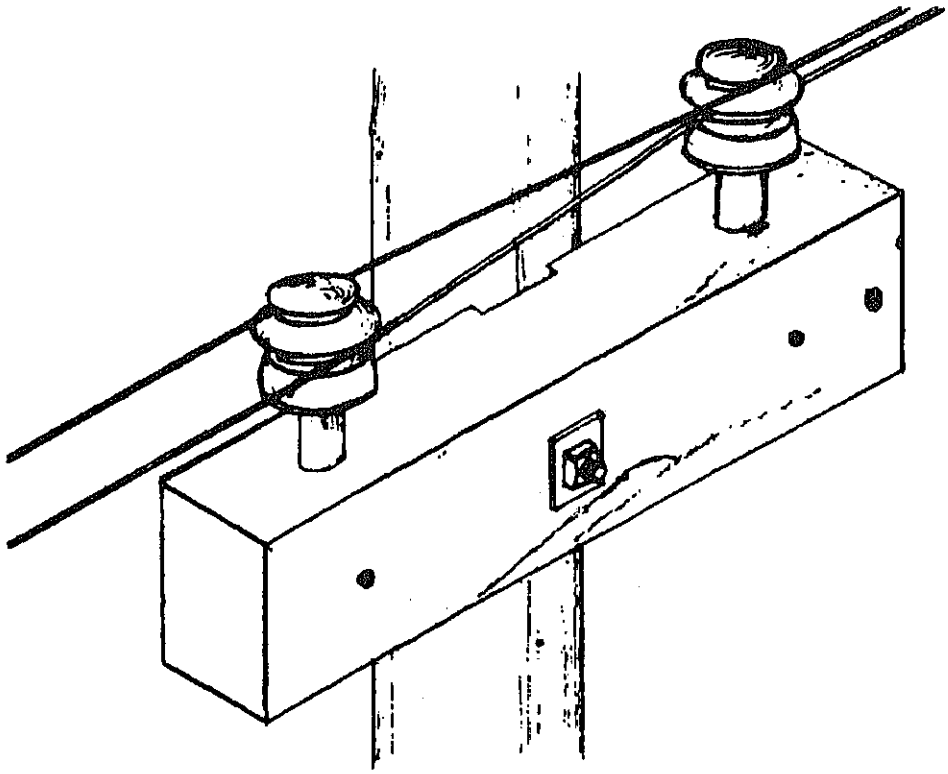


Figure 5 - PB1-1 Unit

11.33 Unit PB1-3 - This is an 18" two-pin crossarm with a 20" crossarm brace mounted on the pole in line with telephone wires. It is used in conjunction with a T-3 or T-4 unit to achieve a tandem transposition at angle poles where the angle turned exceeds 5 degrees.

11.34 Unit PA1-5 - This unit consists of two deadend clevices equipped with insulators and mounted vertically on the pole. This unit is used to deadend a single circuit.

11.35 Unit PB3-1
Unit PB5-1 - These are six-pin type A and ten-pin type A crossarm units, respectively. They are used in joint construction where the circuit requirements exceed one circuit. It should be noted that the PB3-1 can be used to support only four wires since pin positions 5 and 6 must be left vacant in order to provide climbing space. Similarly, the PB5-1 unit can be used up to eight wires with pin positions

5 and 6 vacant. These units are specified because they provide 12" pin spacing which is necessary in spans longer than 250 feet. These units are used in tangent and angle construction in conjunction with units T-1, T-2, and T-6 and T-7.

11.36 Unit PB5-6 - This is a deadend crossarm unit and is used to deadend from four to eight wires with pin positions 5 and 6 left vacant. Deadend clevis assembly unit T-5 is used with this unit.

11.37 Unit PB5-8 - Deadend crossarm assembly unit equipped with back truss and used as above with pin positions 5 and 6 vacant.

11.38 Unit PB3-3
Unit PB5-3 - These are six-pin type B and ten-pin type B crossarm units, respectively. They will accommodate 6 wires or 10 wires with 30" climbing space provided. The pin spacing is reduced to 10". These crossarms, therefore, should not be used when the span lengths exceed 250 feet.

11.39 Appropriate units should be specified where double crossarms, sidearms or other special construction units are needed.

11.4 Explanation of Sample Staking Sheet

The section of power line shown in the sample staking sheet (Fig. 3) assumes that the line is in the medium loading area; it is single phase; #4 7/1 ACSR, 542' ruling span, 35 foot class 7 poles except angle and transformer poles which are class 6. Secondaries are present between P. 8 and P. 9. It is proposed to add two telephone circuits from P. 1 to P. 5 where one circuit leaves this route to serve a side road. The remaining circuit continues to P. 10 where it terminates. The telephone conductor will be .109" diameter, Grade 135 steel. Ground clearance for the telephone conductors varies since part of the line is built along open fields while the other part is constructed in a fence line. (See section 602, TE & CM.) The R1 transposition system will be used. (See section 661, TE & CM.)

11.41 The longest span in this section of line is 475 feet. Reference to RD-Fig. No. 27 indicates that 5 feet of

vertical separation between the multigrounded neutral and the telephone crossarm will be required for this span length. This same separation will be maintained in all span lengths if it is possible to do so but the separation will be adjusted as needed to meet other conditions. The required pole strength is checked by reference to RD-Fig. No. 8. It is found that no poles will have to be changed for insufficient strength.

11.42 This line starts at P. 81, Route 14, but no guying can be installed at this point so the circuits are extended to P. 1, Route 17 by outside distributing wire and two 150 foot L14 units are specified. At P. 1 a deadend crossarm unit NPB5-6 is specified and guying is provided by an NPE1-3G. The guy is grounded to the multigrounded neutral for electrical protection (See TE & CM, section 650.) The span from P.1 to P. 2 is 445 feet over level ground and 14 foot ground clearance is required so 5 foot separation is specified after verifying that sufficient ground clearance will be obtained with this separation. This is done as follows:

> In RD-Fig. No. 58, under the "Basic Ground Clearance" heading, the 14 foot column is selected. Going down this column to the 5 foot mark, the curve opposite this mark is selected and followed to the intersection with the horizontal line representing a 35 foot pole. The point of intersection occurs at 495 feet, indicating that a level ground span of 495 feet would be the maximum permissible. Since the actual span is 445 feet, 5 foot separation is satisfactory.

At P. 1 it is also necessary to verify that the L14 units can be attached to the pole at sufficient height to obtain the necessary 18 foot road crossing clearance. Since the point of attachment for these units need be only 40 inches below the neutral, these units can be attached 22 feet above the ground which will meet the road crossing requirement.

11.43 At P. 2 an NPB3-1 unit with two NT-1 units is specified. (Transposition units are not installed until P. 3 since the deadend crossarm provides a wire spacing of only 6 inches.) The span length between P. 2 and P. 3 is 420 feet with a 1 foot ridge at midspan and 14 foot

ground clearance is required in this span so 5 foot separation is again specified.

11.44 At P. 3 and P. 4 the proper units are specified with 5 foot separation indicated.

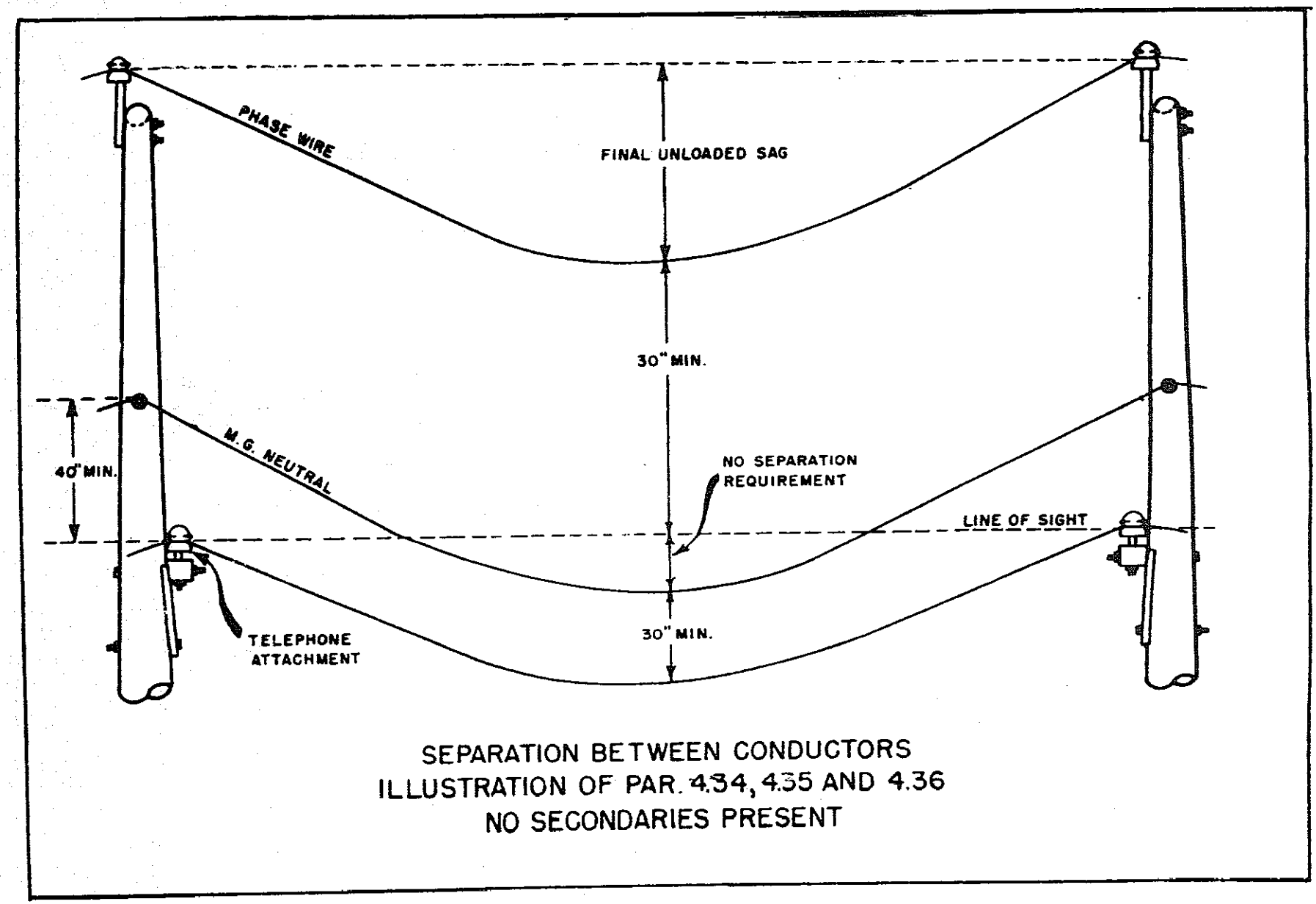
11.45 At P. 5, one circuit makes a right angle turn while the other circuit continues on the same route. The circuit which serves Route 21 must cross the road with 18 foot clearance. We are interested now in the span from P. 5, Route 17, to P. 1, Route 21, which is also joint construction. This span is actually 410 feet. A 410 foot span requires 4 1/2 feet of separation at the pole. Through reference to RD-Fig. No. 58, it is determined that 18 foot basic clearance (19.6 foot actual clearance) cannot be obtained in a 410 foot span at midspan over level ground. Rule 232B of the NESC permits reduced clearance if the crossing does not occur at midspan. Application of this rule shows that if the point of crossing occurs within 70 feet of P. 5, we will need only 18 feet of clearance. This means that we should attach the unit (NPA1-5) which supports this circuit 4 1/2 feet below the neutral which would place it 21 feet above ground on a 35 foot pole, and thus provide the necessary road clearance. If the point of crossing occurred at a distance greater than 70 feet, it would be necessary to place a 40 foot pole at this location. The crossarm unit NPB1-1 which supports the other circuit should be attached 5 feet below the neutral. It should be noted that #14 gauge bridle wire is specified at this point. This is necessary since no power contact protectors have been installed on this circuit between P. 1 and P. 5. It is assumed that they will be installed on this circuit somewhere along Route 21. This means that a contact occurring between P. 1 and P. 5 would cause the protector on Route 21 to operate and the bridle wire would have to carry the fault current.

11.46 At P. 6 an NPB1-4 unit is specified attached 4 feet below the neutral and at P. 7 an NPB1-1 unit is specified 4 feet below the neutral. The reduction in separation is required to give the necessary road crossing clearance. RD-Fig. No. 27 shows that these separations are not less than the minimum required for a 370 foot span.

11.47 At P. 8 it is necessary to increase the separation to 8 1/2 feet in order to clear the secondaries at this pole. This section of the line is built in a fence line so a minimum ground clearance of 8 feet is acceptable in this span. Reference to RD-Fig. No. 58 shows that sufficient ground clearance can be obtained with 8 1/2 foot separation. A power contact protector (NP4-1) is specified at this point. This is approximately 1/2 mile from the start of the joint use section of line. (See section 820, TE & CM.)

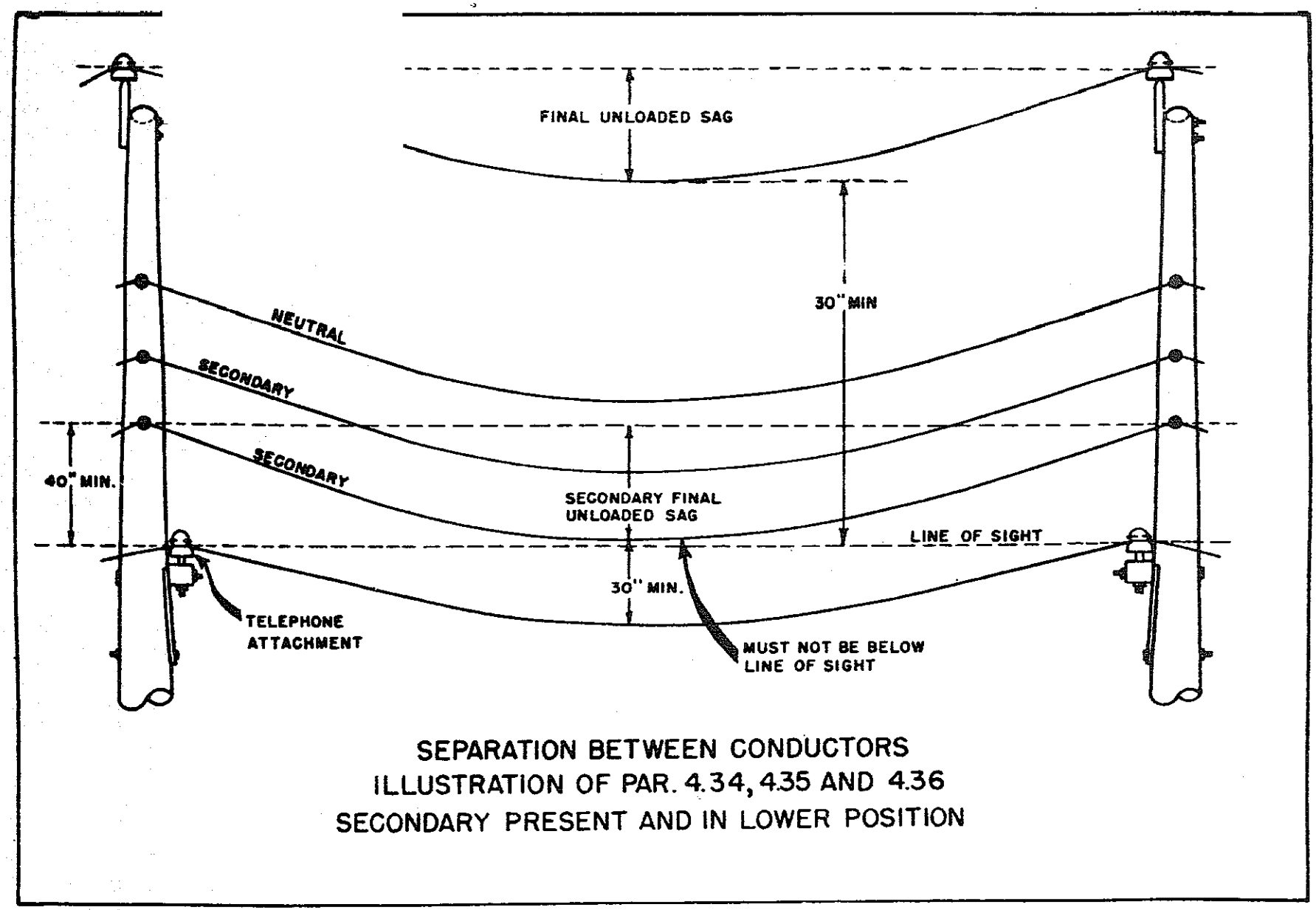
11.48 At P. 9 and P. 10 the same procedure is carried out to establish the separation which must be specified at these points. The ground clearance must be verified in each span as above.

11.5 Careful attention to details in staking joint use lines is necessary if full economy is to be realized from this type of construction. It should be recognized that this type of staking should not be undertaken without complete familiarity with the provisions of the NESC relating to joint use, with the EEI publications on joint use (paragraph 2.2) and with the provisions of this section and other pertinent sections of the REA Telephone Engineering and Construction Manual.



SEPARATION BETWEEN CONDUCTORS
ILLUSTRATION OF PAR. 4.34, 4.35 AND 4.36
NO SECONDARIES PRESENT

Figure 1



SEPARATION BETWEEN CONDUCTORS
ILLUSTRATION OF PAR. 4.34, 4.35 AND 4.36
SECONDARY PRESENT AND IN LOWER POSITION

Figure 2

REA TE & CM 690

MAXIMUM SEPARATION AT POLE

The following table indicates the maximum separation permissible between power neutral and telephone conductors, at the pole, for the basic ground clearances shown:

Basic Ground Clearance	Maximum Separation at Pole	
	30 Foot Pole	35 Foot Pole
8'	13'	17.5'
10'	11'	15.5'
12'	9'	13.5'
14'	7'	11.5'
15'	6'	10.5'
18'	3'	7.5'

RD - Fig. No. 63

REFERENCE DATA

RD-FIGURE NO. 1 THROUGH RD-FIGURE NO. 15

Maximum Spans for Joint Use by Class of Pole

RD-FIGURE NO. 16

REA Pole Head Configuration

RD-FIGURE NO. 17

Diameters of Commonly Used Power Conductors

RD-FIGURE NO. 18 THROUGH RD-FIGURE NO. 53

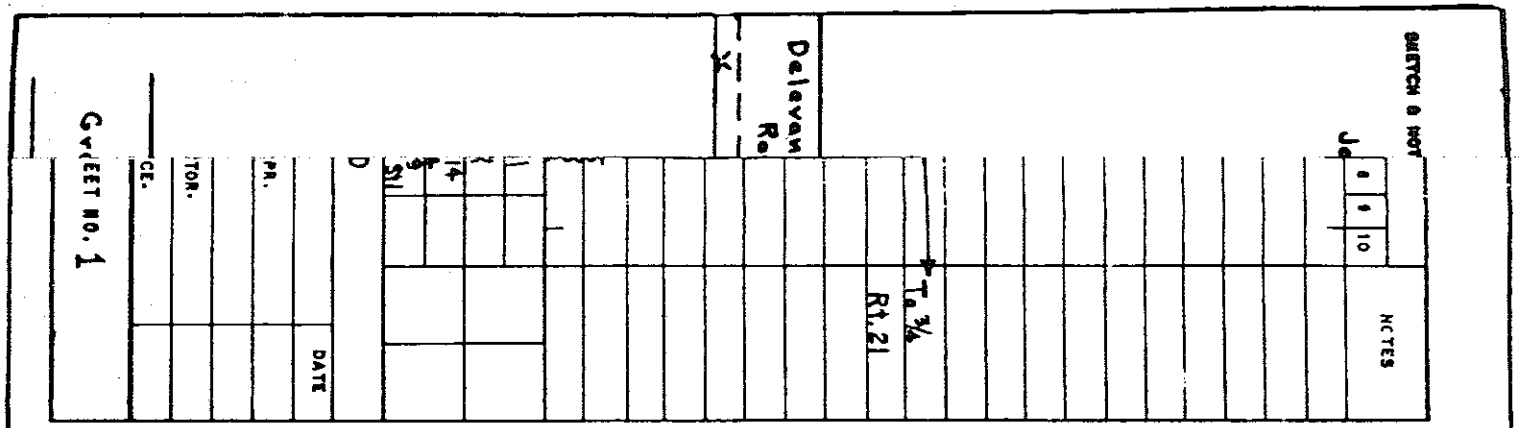
Vertical Separation Tables for Telephone Underbuild on REA Electric Poles

RD-FIGURE NO. 54 THROUGH RD-FIGURE NO. 62

Staking Curves for Telephone Underbuild on REA Electric Power Lines

RD-FIGURE NO. 63

Maximum Separation at Pole



ASSIGNMENT SHEET

SHEET NO.

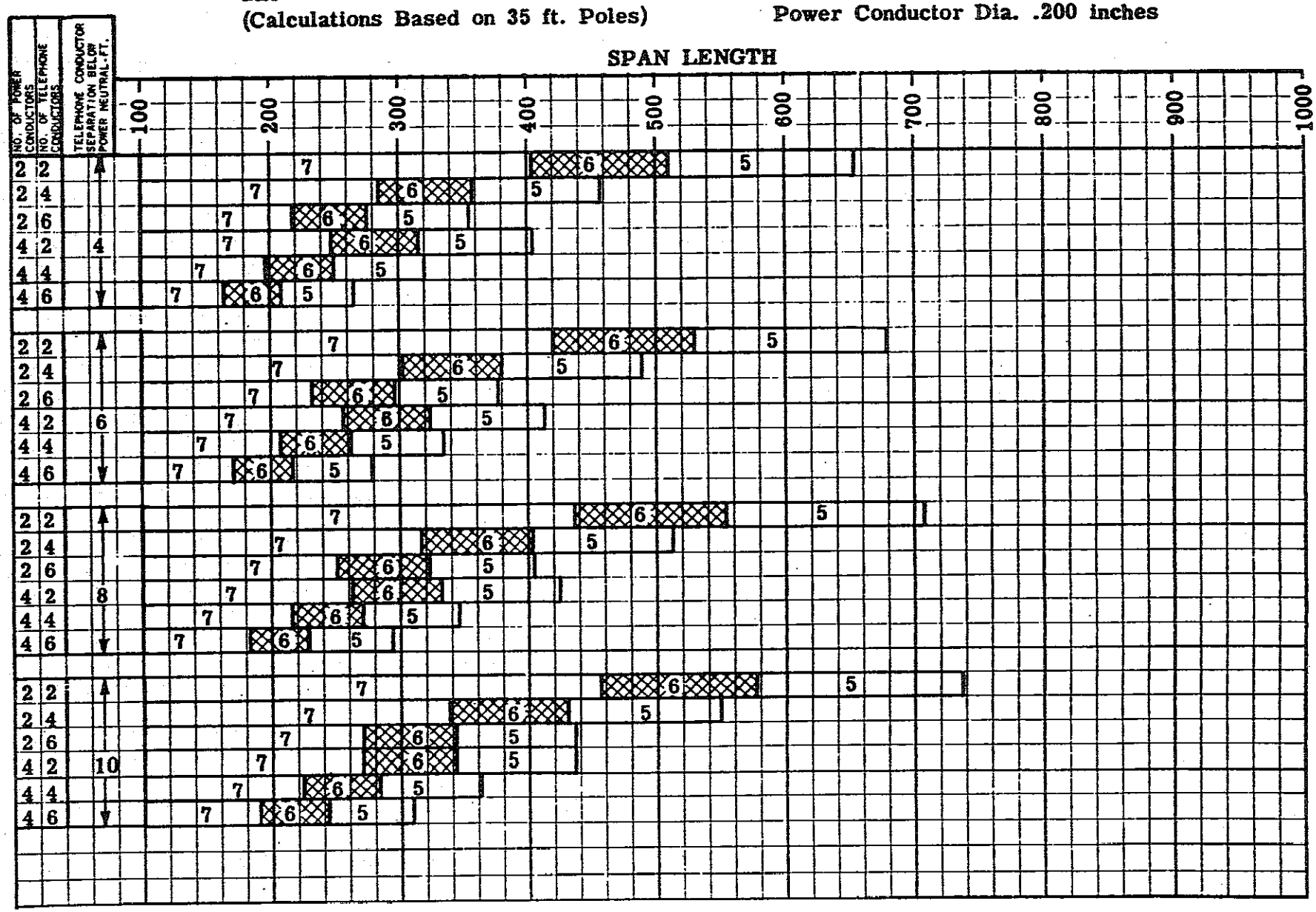
EXCHANGE | COUNTY | PREPARED BY | DATE

NO.	SUBSC. MAP NO.	NAME	ADDRESS	POLE NO.	OLD TEL. NO.	NEW TEL. NO.	CLASS SERVICE	CABLE & TERM.	CABLE PAIR	PIN POSITIONS	DROP WIRE K18	PROT. UNIT "P"	TYPE STA. EQUIP.
	9.6.1	C.H. Brown	Hill Rd.	8	–	2764	8R	#2 11	23	3/4	170'	2-1A	51-1
	9.6.4	R.E. Jones	"	10	–	2762	"	"	"	"	145'	2-1A	51-1
			Note: Drop wire units are "N" units										

MAXIMUM SPANS FOR JOINT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — **HEAVY LOADING DISTRICT**

(Calculations Based on 35 ft. Poles) — **Power Conductor Dia. .200 inches**

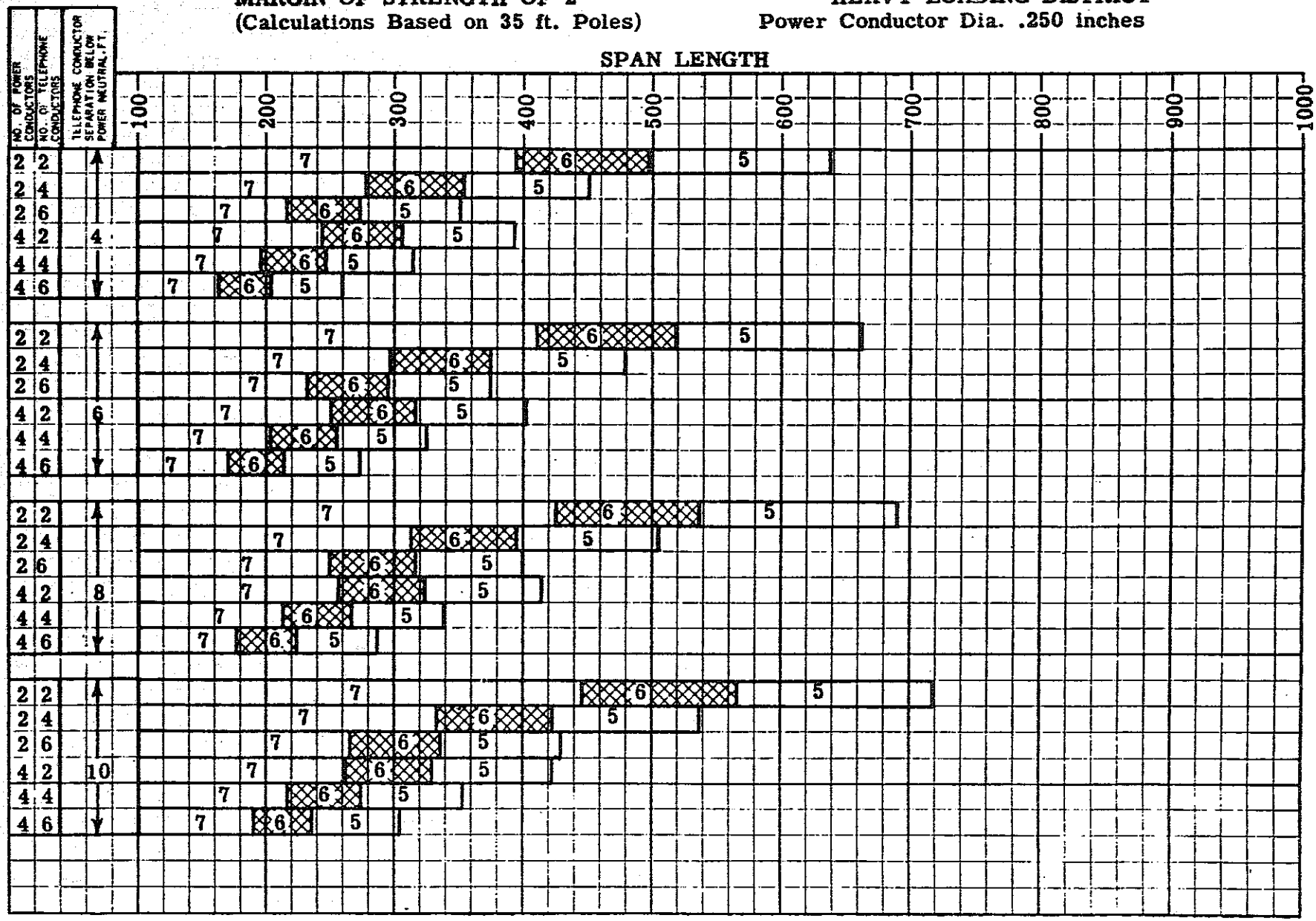


RD-Fig. No. 1

MAXIMUN SPANS FOR JOINT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — **HEAVY LOADING DISTRICT**

(Calculations Based on 35 ft. Poles) — **Power Conductor Dia. .250 inches**

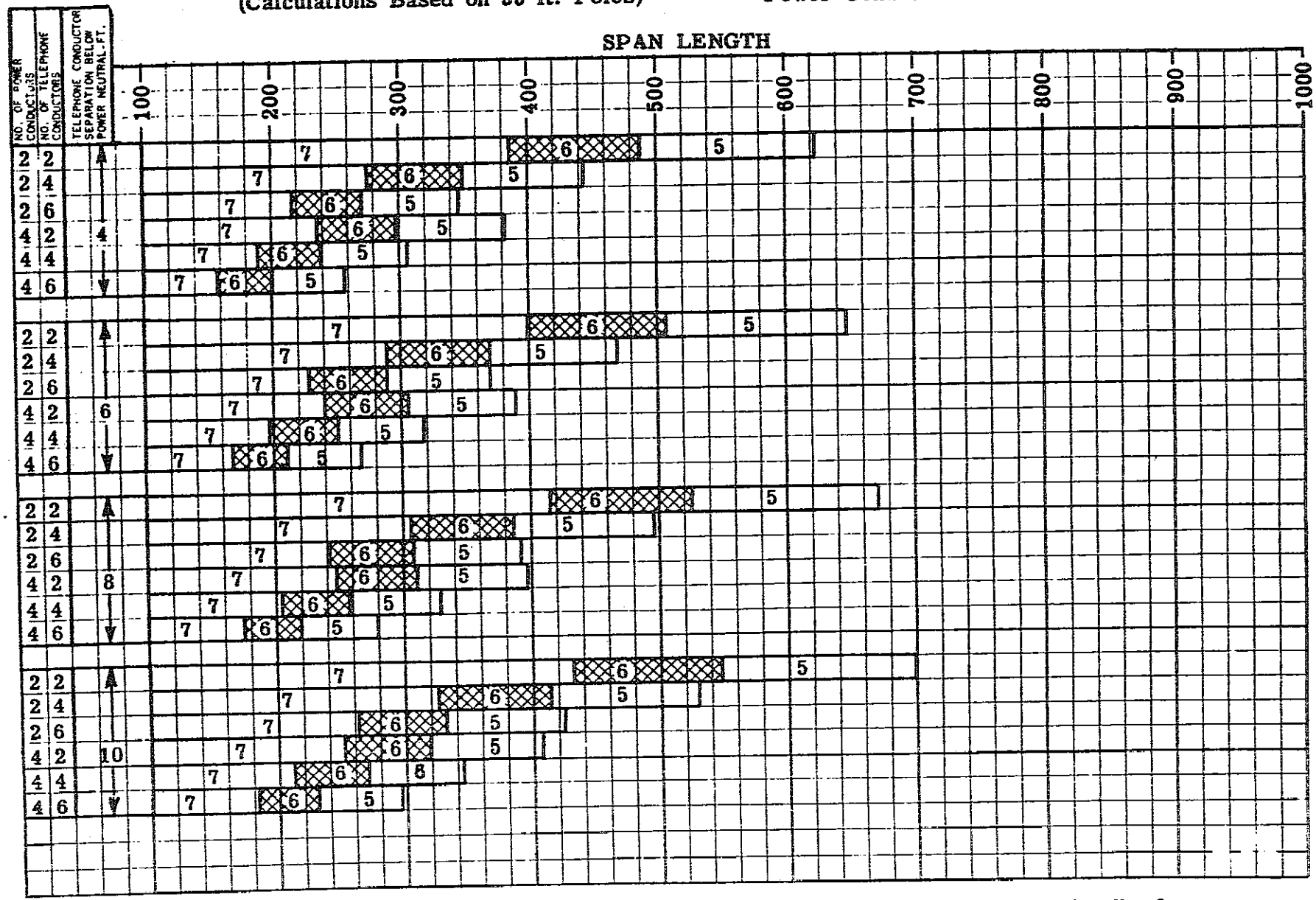


RD-Fig. No. 2

MAXIMUM SPANS FOR JOINT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2
(Calculations Based on 35 ft. Poles)

HEAVY LOADING DISTRICT
Power Conductor Dia. .300 inches

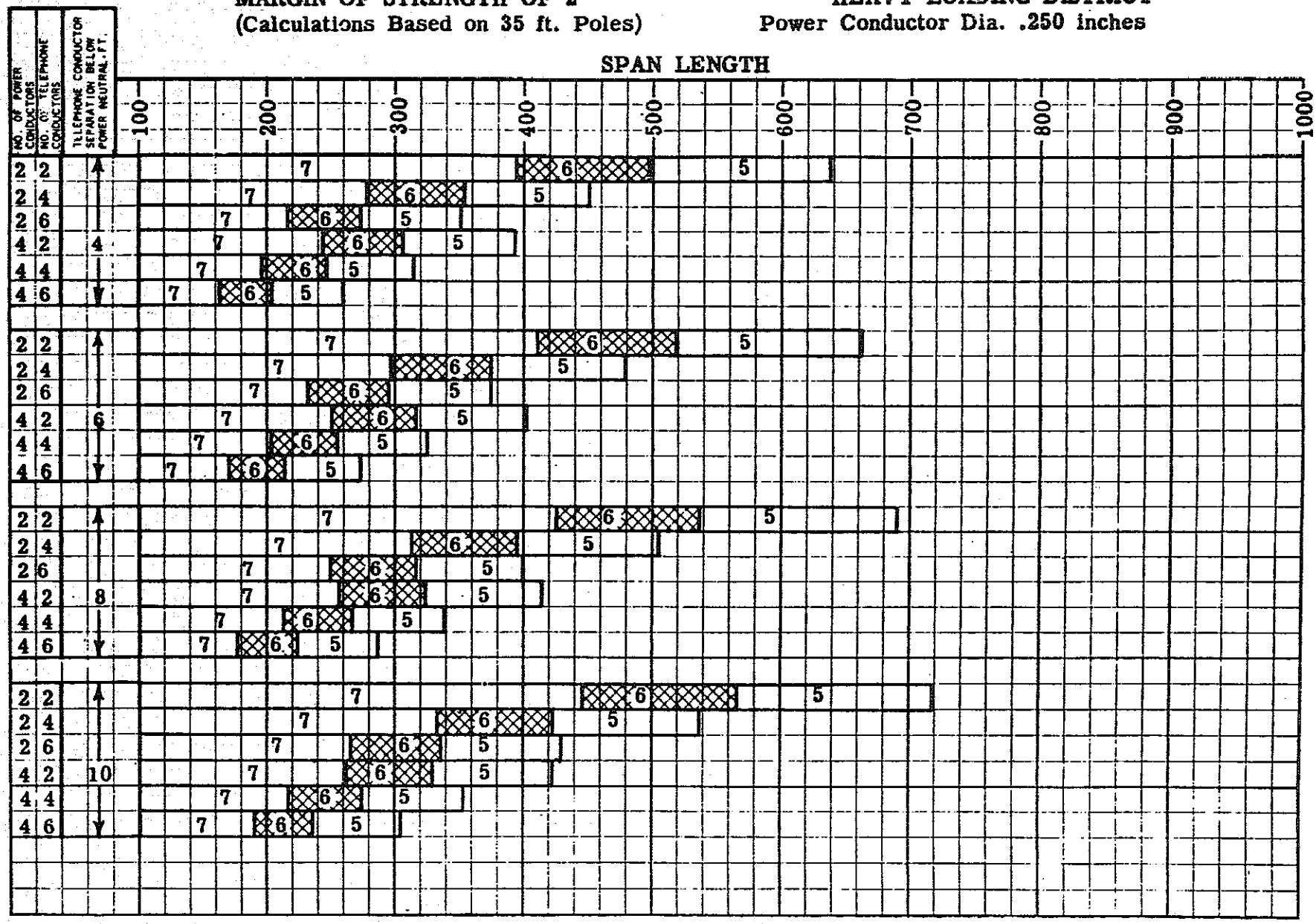


RD-Fig. No. 3

MAXIMUN SPANS FOR JOINT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — **HEAVY LOADING DISTRICT**

(Calculations Based on 35 ft. Poles) — Power Conductor Dia. .250 inches

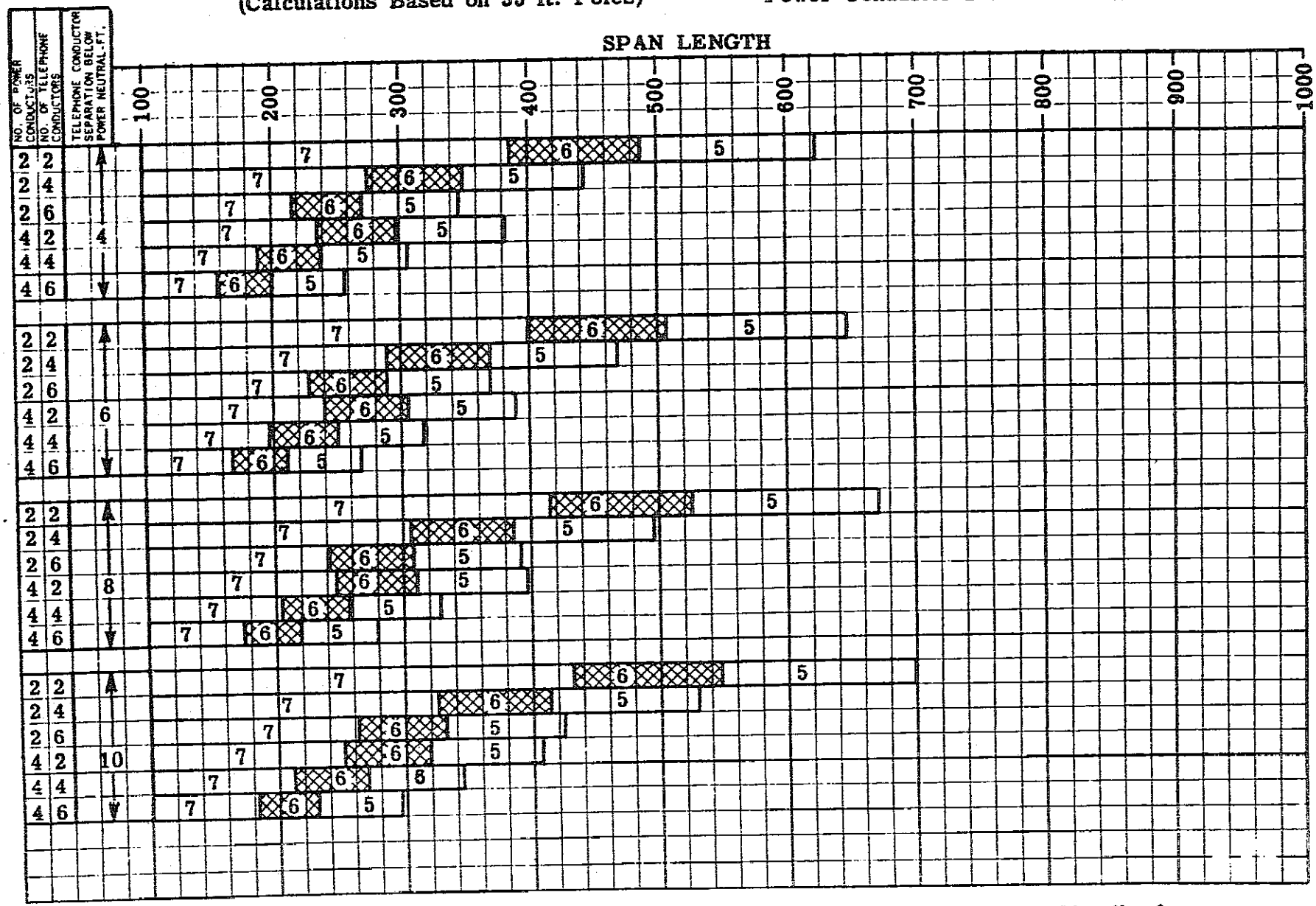


RD-Fig. No. 2

MAXIMUM SPANS FOR JOINT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2
(Calculations Based on 35 ft. Poles)

HEAVY LOADING DISTRICT
Power Conductor Dia. .300 inches

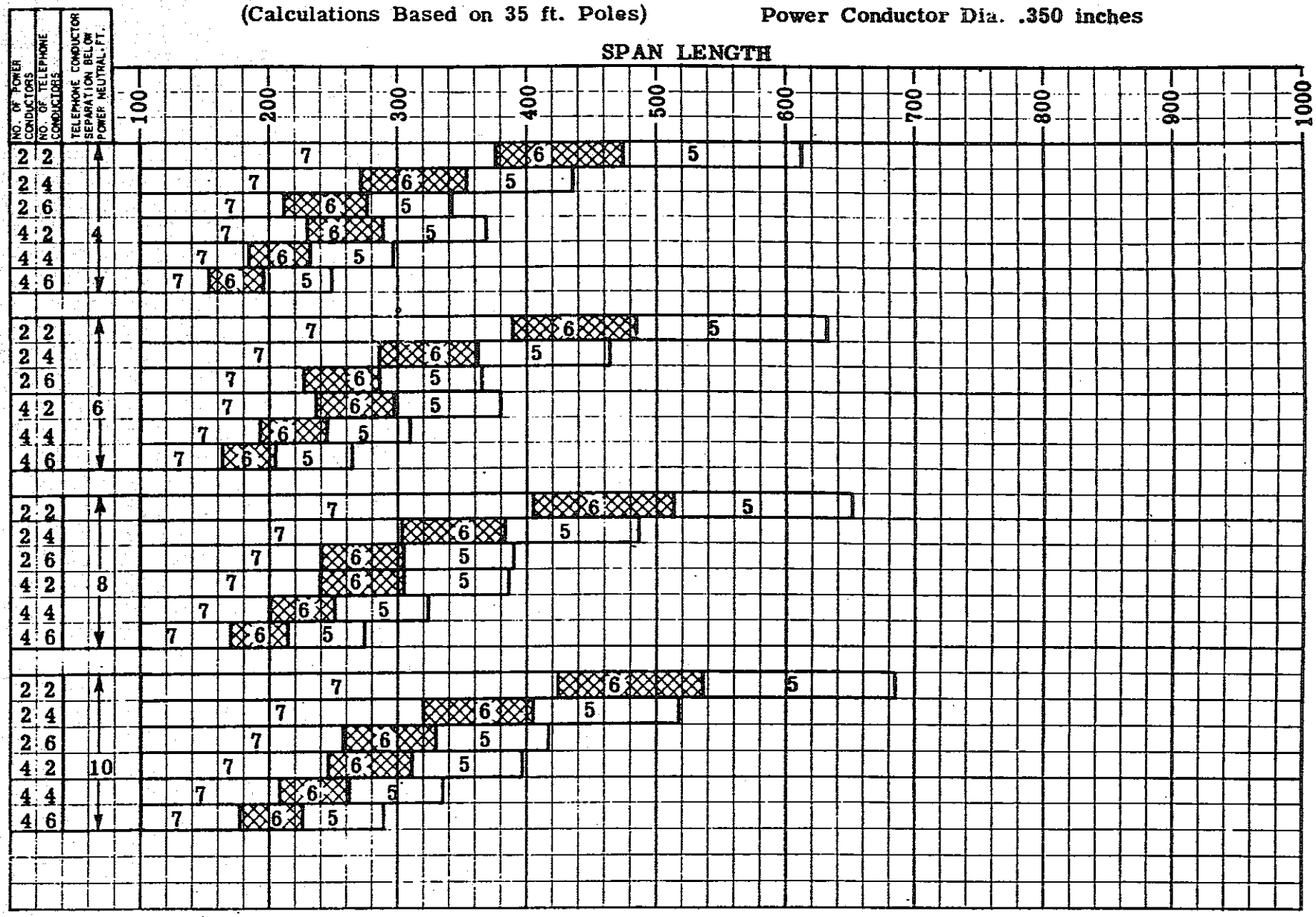


RD-Fig. No. 3

MAXIMUM SPANS FOR [illegible] USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — **HEAVY LOADING DISTRICT**

(Calculations Based on 35 ft. Poles) — **Power Conductor Dia. .350 inches**

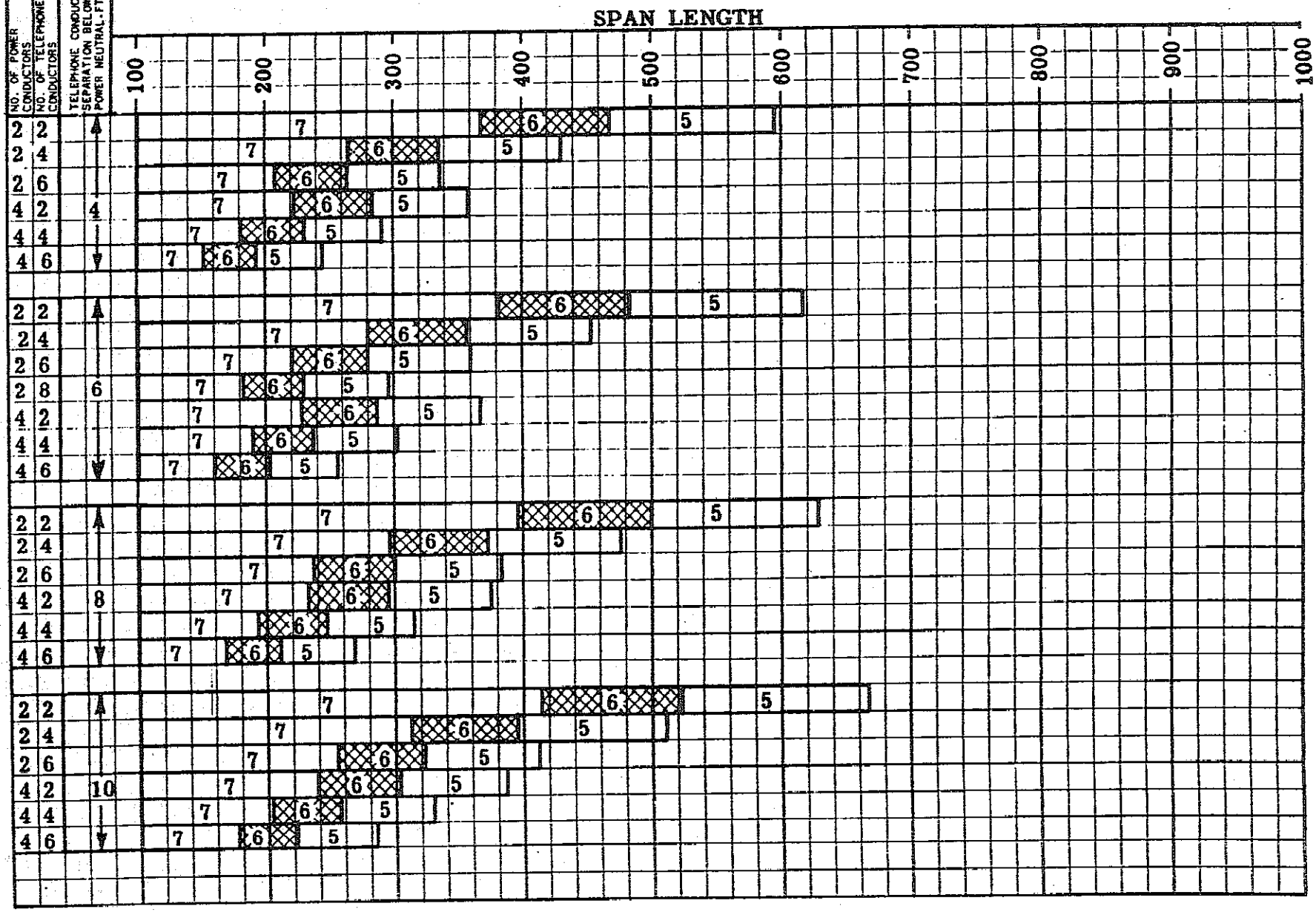


RD-Fig. No. 4

MAXIMUM SPANS FOR J[illegible] USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — HEAVY LOADING DISTRICT

(Calculations Based on 35 ft. Poles) — Power Conductor Dia. .400 inches

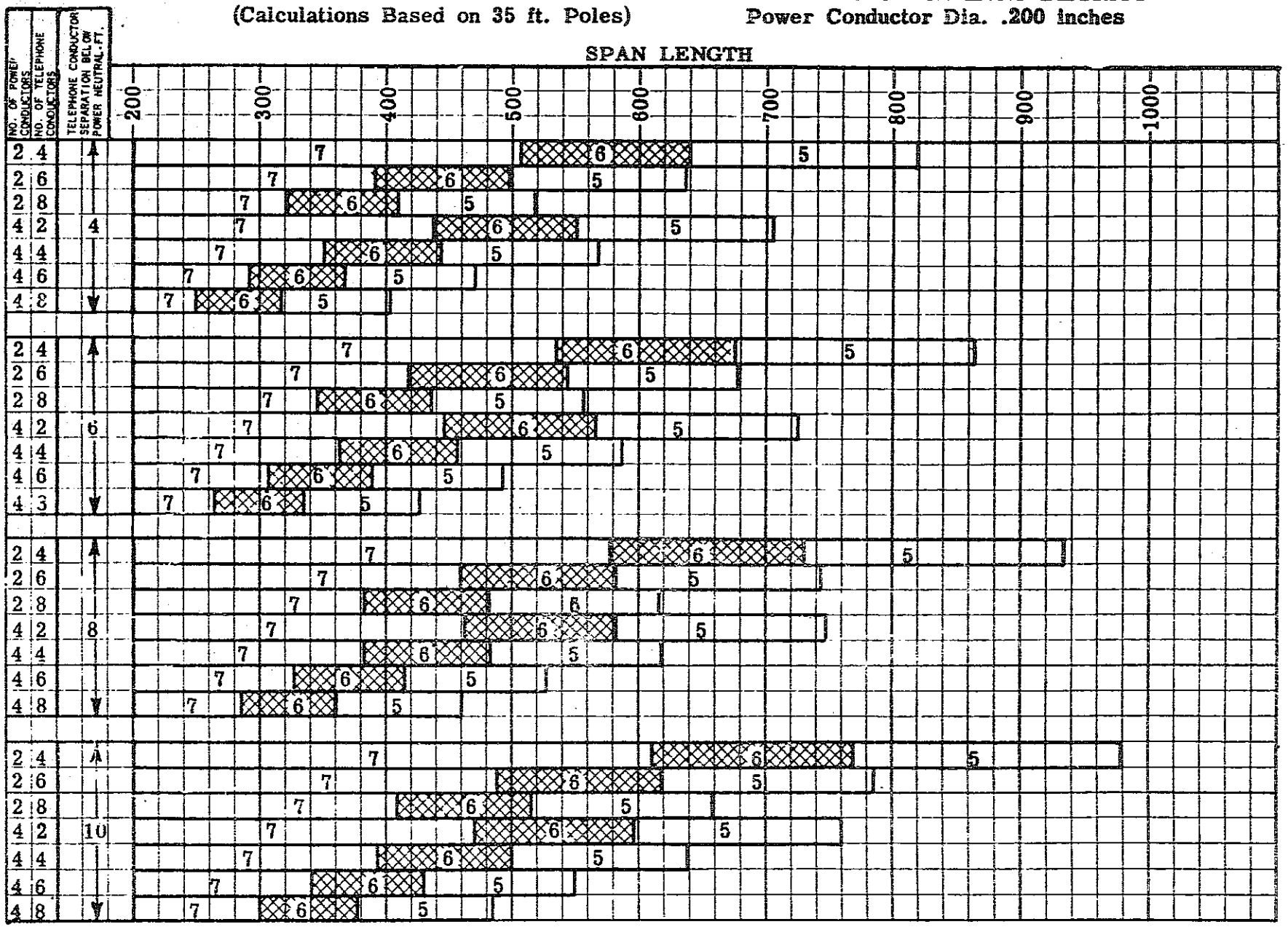


RD-Fig. No. 5

MAXIMUM SPANS FOR T USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — MEDIUM LOADING DISTRICT

(Calculations Based on 35 ft. Poles) — Power Conductor Dia. .200 inches

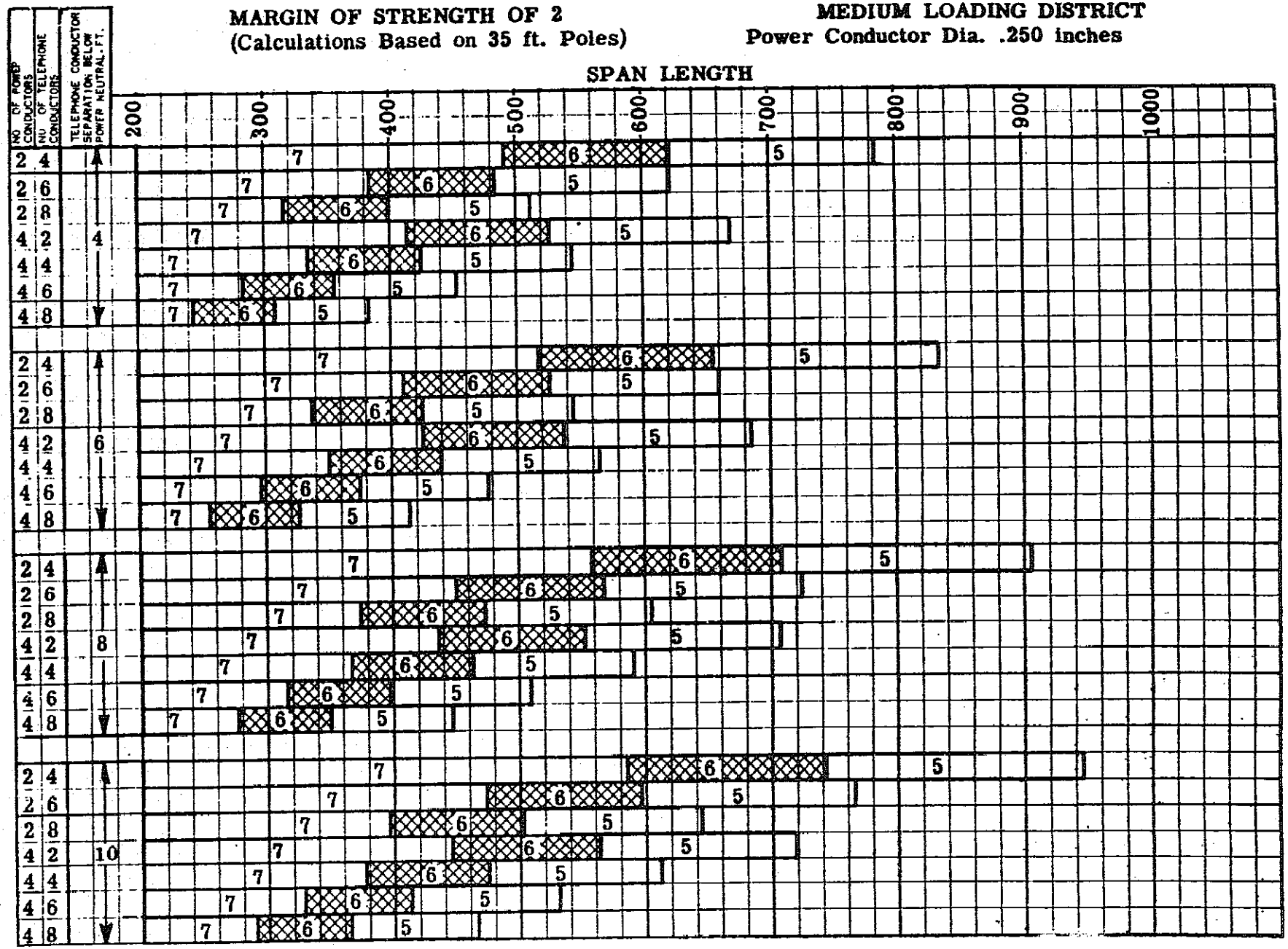


RD-Fig. No. 6

MAXIMUM SPANS FOR JOINT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2
(Calculations Based on 35 ft. Poles)

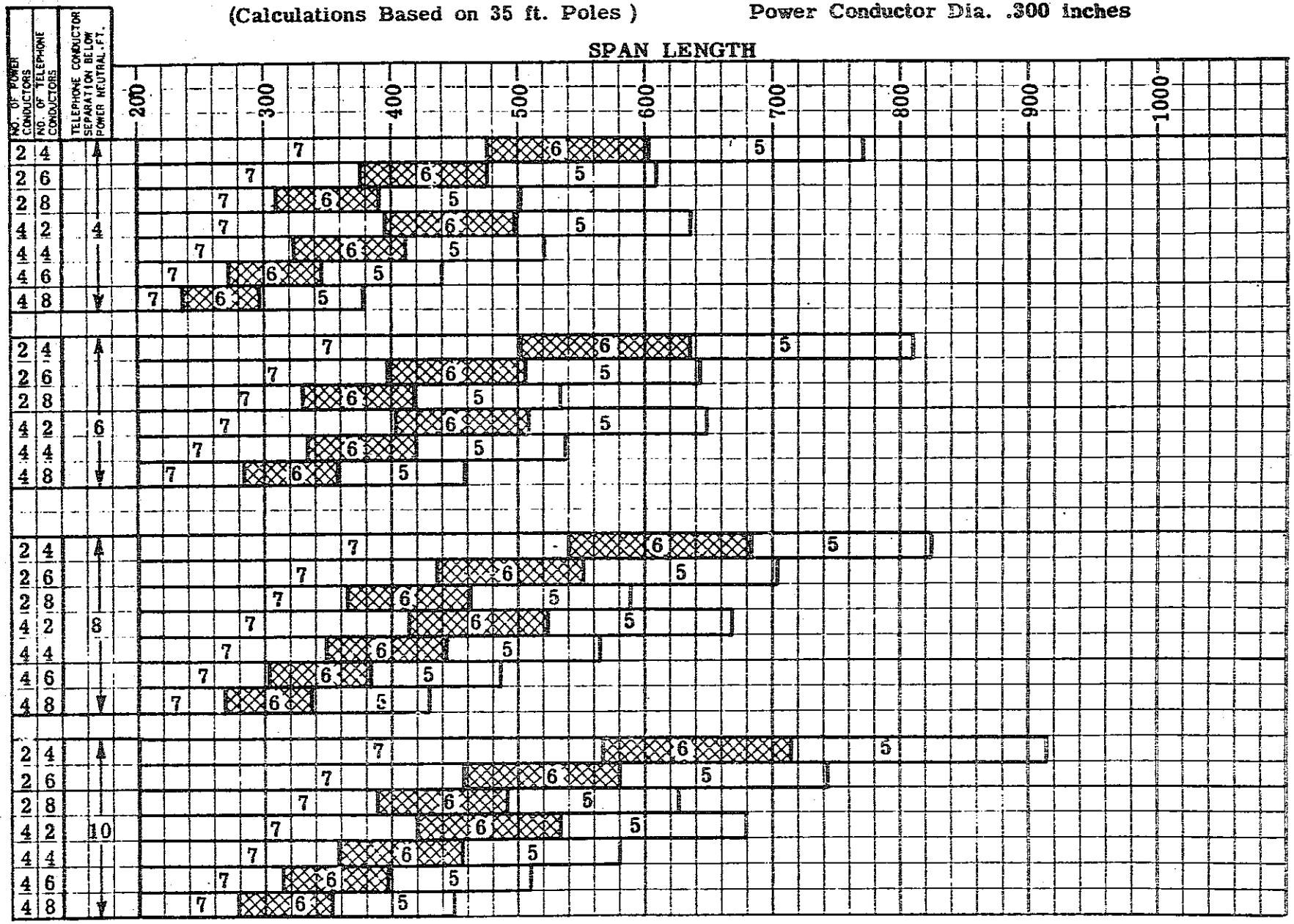
MEDIUM LOADING DISTRICT
Power Conductor Dia. .250 inches



MAXIMUM SPANS FOR JOINT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — **MEDIUM LOADING DISTRICT**

(Calculations Based on 35 ft. Poles) — **Power Conductor Dia. .300 inches**

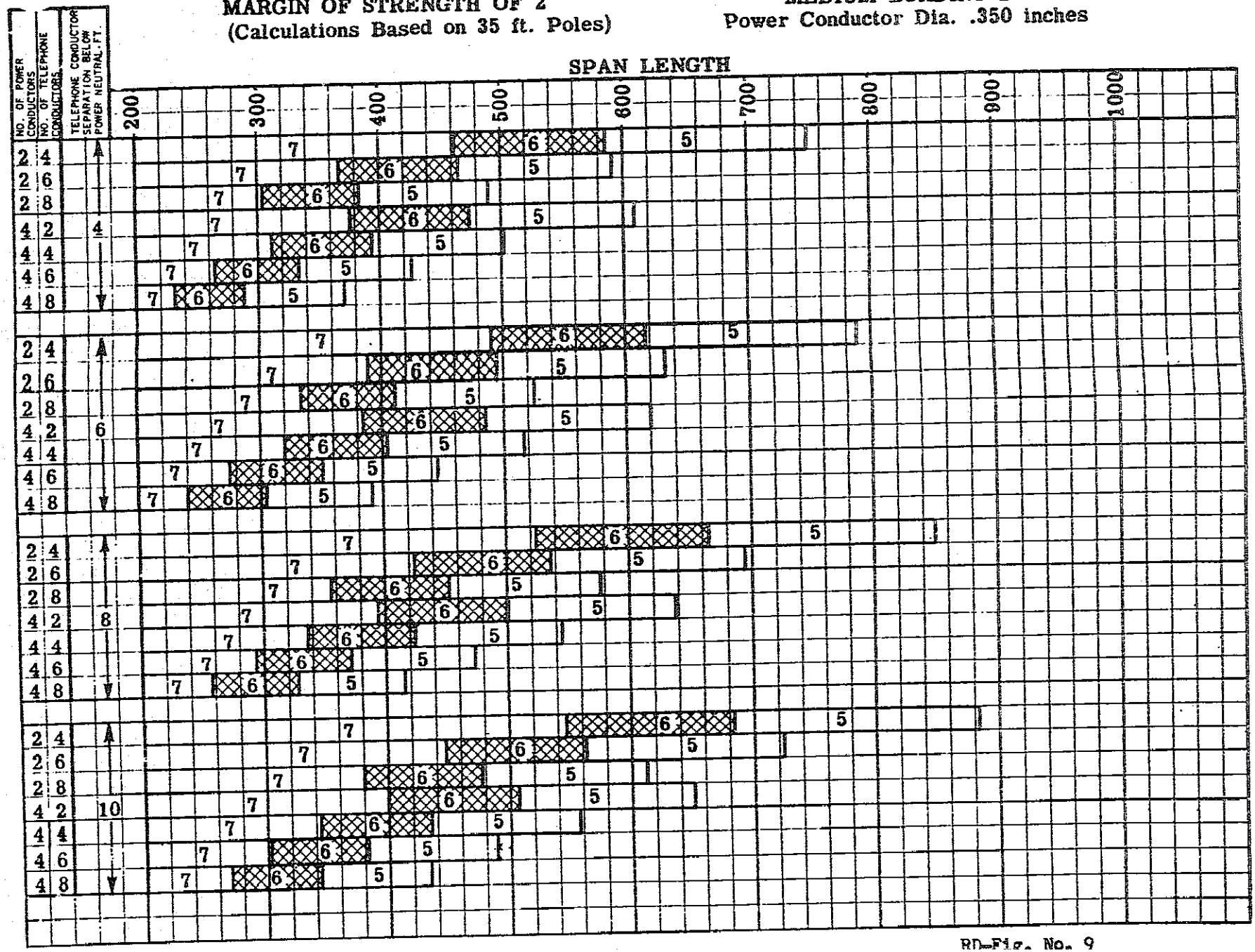


RD-Fig. No. 8

MAXIMUM SPANS F[illegible]INT USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2
(Calculations Based on 35 ft. Poles)

MEDIUM LOADING DISTRICT
Power Conductor Dia. .350 inches

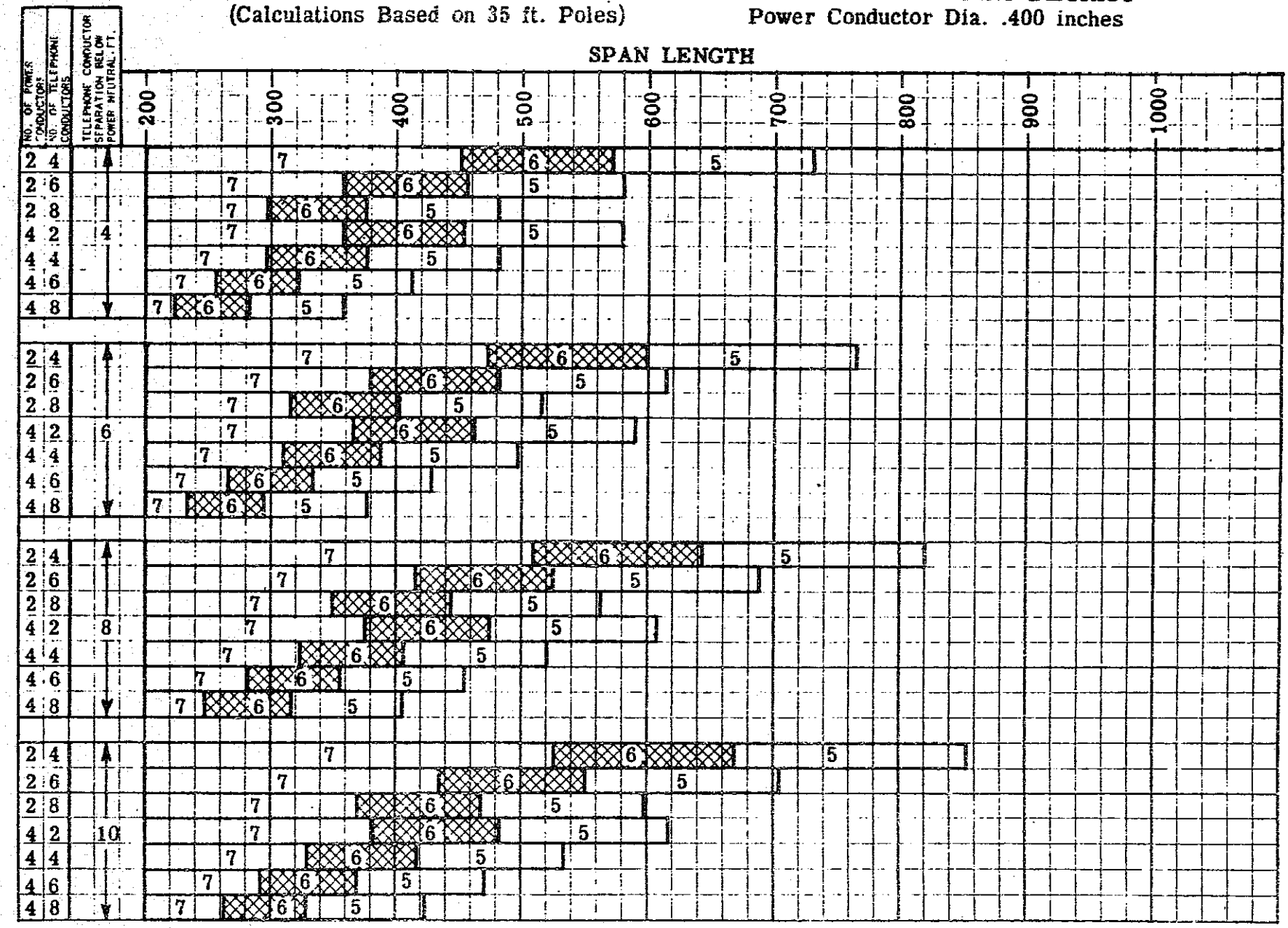


RD-Fig. No. 9

MAXIMUM SPANS FOR USE BY CLASS OF POLE

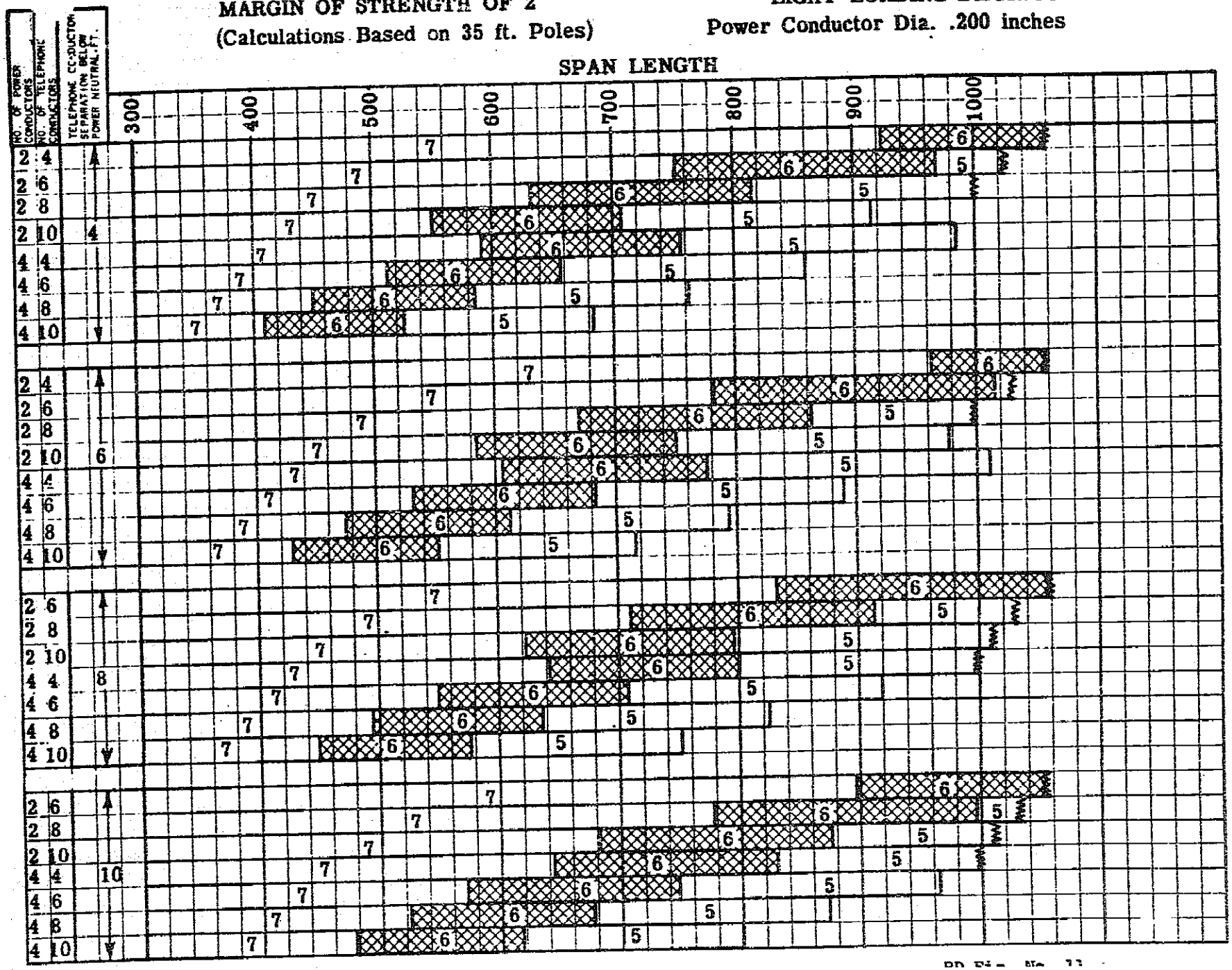
MARGIN OF STRENGTH OF 2
(Calculations Based on 35 ft. Poles)

MEDIUM LOADING DISTRICT
Power Conductor Dia. .400 inches



RD-Fig. No. 10

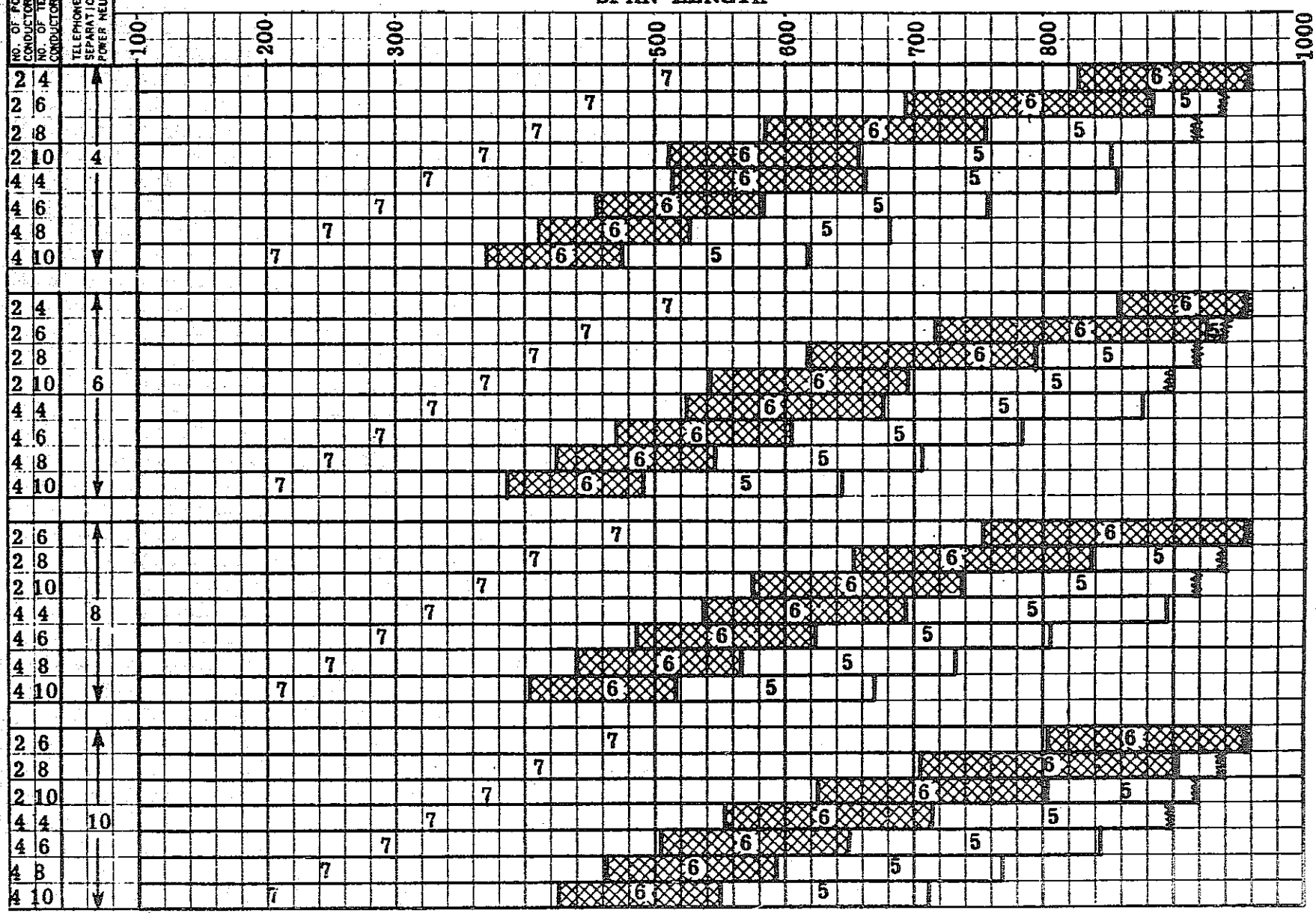
MAXIMUM SPANS F[illegible]FT USE BY CLASS OF POLE
MARGIN OF STRENGTH OF 2
LIGHT LOADING DISTRICT
(Calculations Based on 35 ft. Poles)
Power Conductor Dia. .200 inches



MAXIMUM SPANS F[illegible] F USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — LIGHT LOADING DISTRICT

(Calculations Based on 35 ft. Poles) — Power Conductor Dia. .250 inches

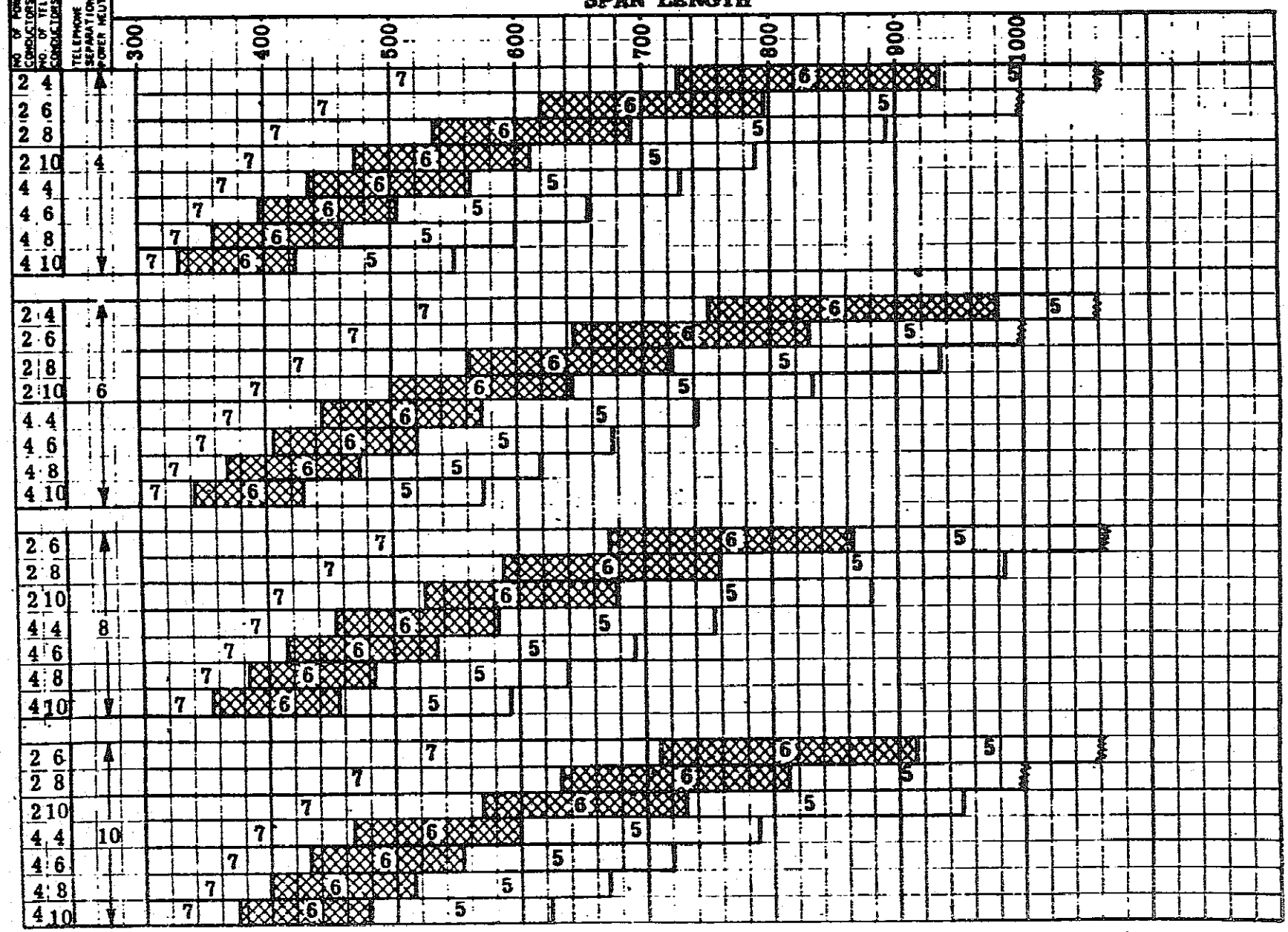


RD-Fig. No. 12

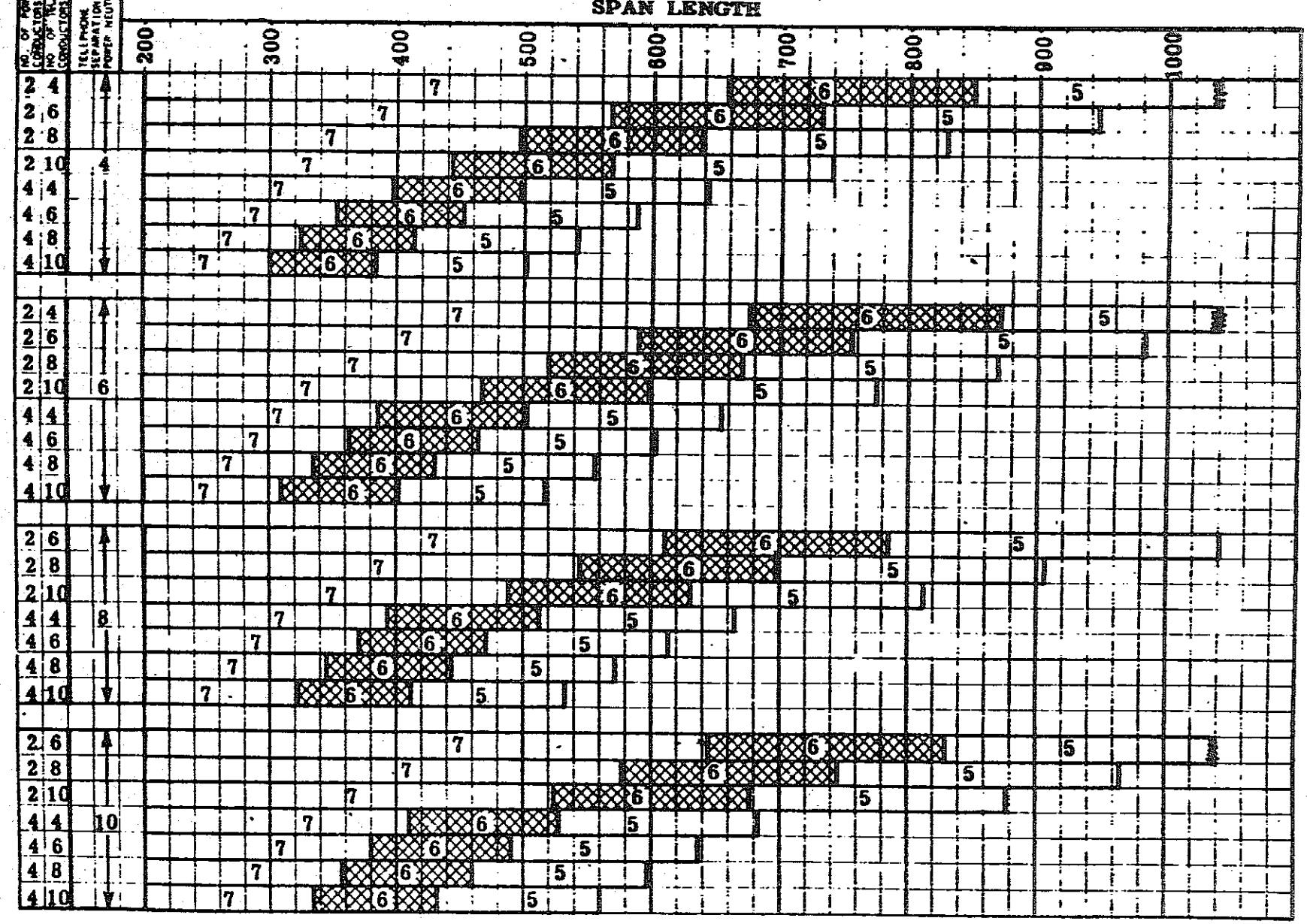
MAXIMUM SPANS FOR ... USE BY CLASS OF POLE

MARGIN OF STRENGTH OF 2 — **LIGHT LOADING DISTRICT**

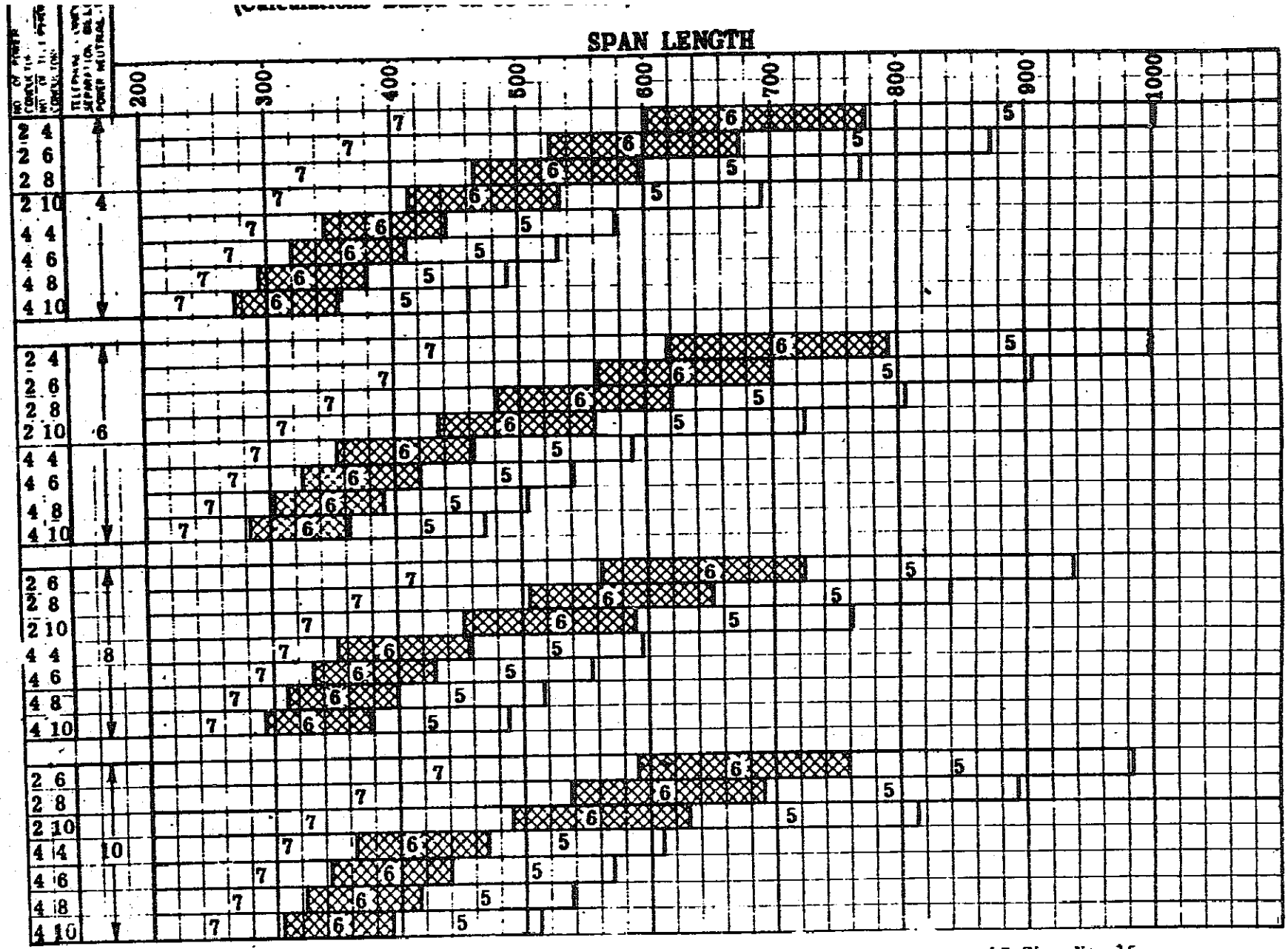
(Calculations Based on 35 ft. Poles) — **Power Conductor Dia. .300 inches**



RD-Fig. No. 13

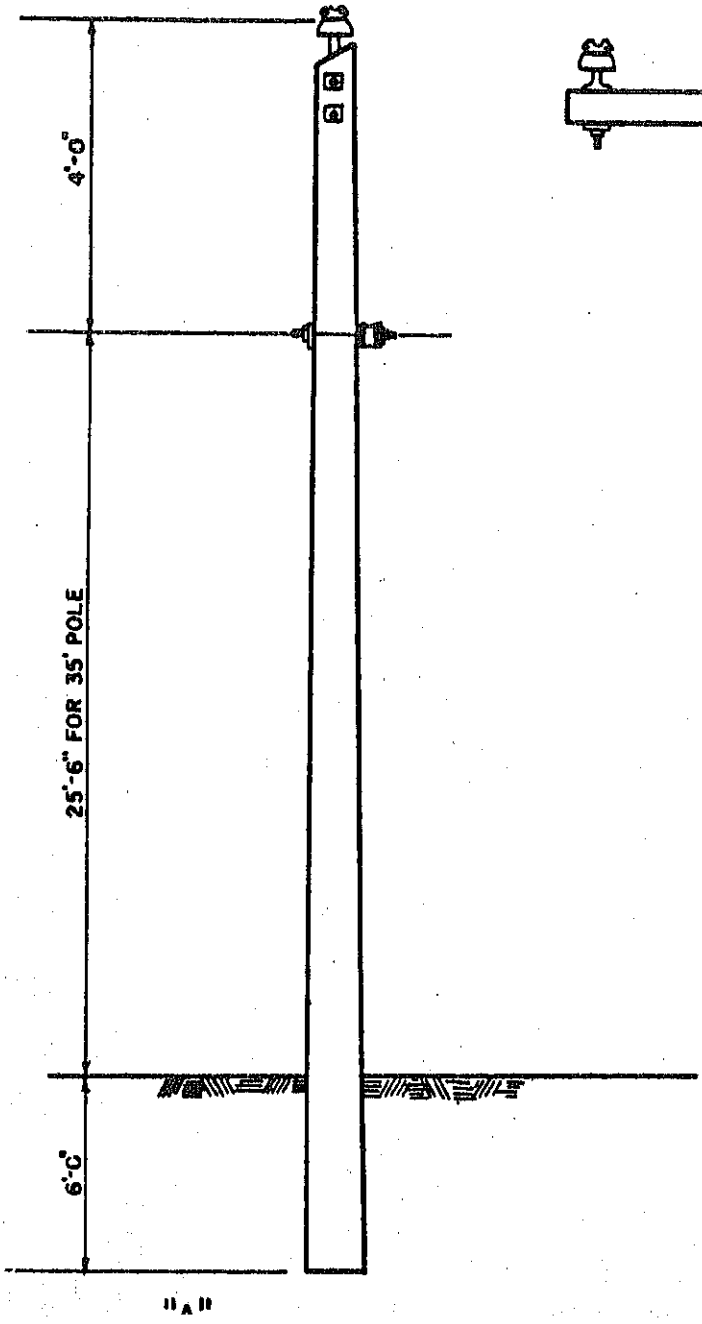

SPAN LENGTH
200
300
400
500
600
700
800
900
1000
2 4
2 6
2 8
2 10
4 4
4 6
4 8
4 10
4
6
8
10

RD-Fig. No. 14

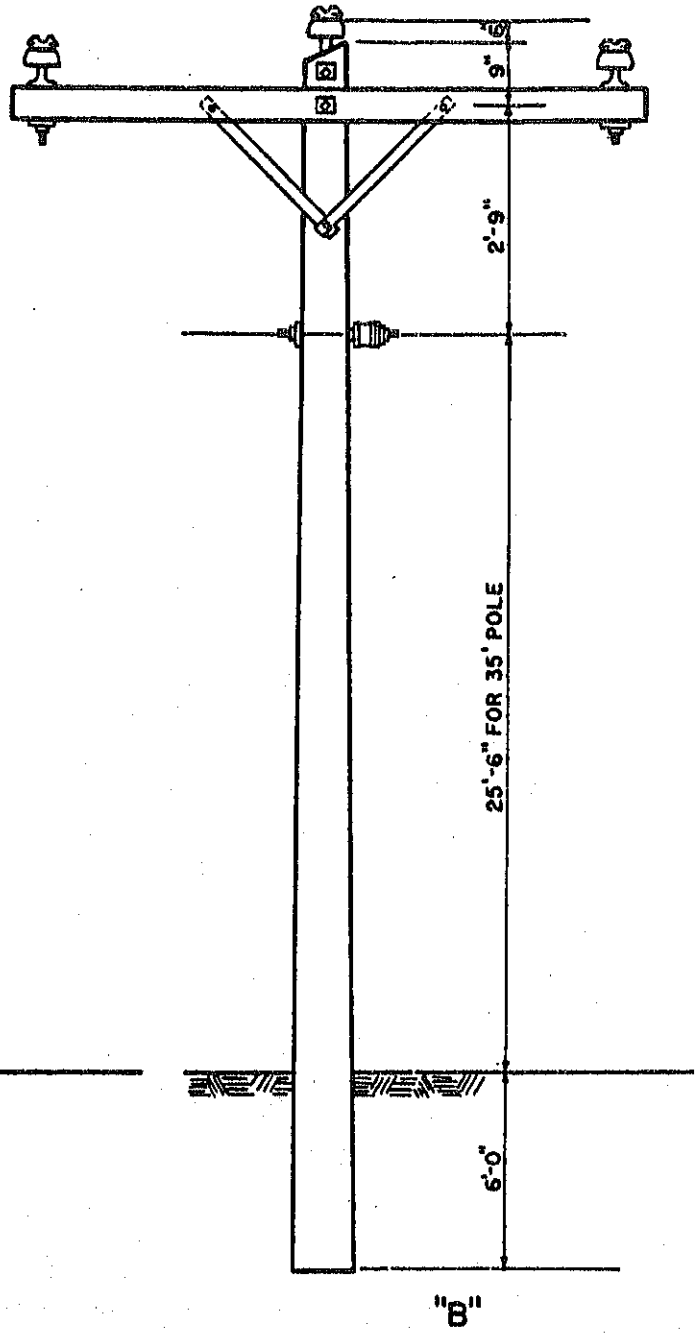

SPAN LENGTH
200
300
400
500
600
700
800
900
1000
2 4
2 6
2 8
2 10
4 4
4 6
4 8
4 10
4
6
8
10

HD-Fig. No. 15

REA POLE-HEAD CONFIGURATION



"A"



"B"

THREE PHASE
FOUR-WIRE
CONSTRUCTION

RD — Fig. No. 1E

JOINT USE REFERENCE DATA

FOR COMMONLY USED POWER CONDUCTORS

Power Conductor	Diameter (in)
1/0-6/1 ACSR	.396
1/0-7 St'd. Cu.	.368
2-7/1 ACSR	.325
2-3 St'd. Cu.	.320
2-6/1 ACSR	.316
4-7/1 ACSR	.257
2 - Hd. Cu.	.257
4-6/1 ACSR	.250
6A-Cwc.	.230
4 - Hd. Cu.	.204
8A-Cwc.	.199
6 - Hd. Cu.	.162

Notes:
The above listed power conductors are those commonly used in REA type construction. The joint use pole strength tables were calculated for five different conductor diameters and the engineer should select the table based on diameter nearest to, but not less than, diameter of the power conductor being considered.

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Heavy

POWER CONDUCTOR: No. 4 7/1 ACSR

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	326' RULING SPAN		350' RULING SPAN		387' RULING SPAN		450' RULING SPAN		500' RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200	3.5'	6.5'	4.0'	7.0'	4.5'	7.5'	4.5'	7.5'	5.0'	8.0'
210	4.0'	7.0'	"	"	"	"	5.0'	8.0'	"	"
220	"	"	"	"	"	"	"	"	5.5'	8.5'
230	"	"	4.5'	7.5'	5.0'	8.0'	5.5'	8.5'	"	"
240	"	"	"	"	"	"	"	"	6.0'	9.0'
250	4.5'	7.5'	"	"	"	"	6.0'	9.0'	"	"
260	"	"	5.0'	8.0'	5.5'	8.5'	"	"	6.5'	9.5'
270	"	"	"	"	"	"	"	"	"	"
280	"	"	"	"	"	"	6.5'	9.5'	7.0'	10.0'
290	"	"	"	"	6.0'	9.0'	7.0'	10.0'	7.5'	10.5'
300	5.0'	8.0'	5.5'	8.5'	"	"	"	"	"	"
310	"	"	"	"	6.5'	9.5'	7.5'	10.5'	8.0'	11.0'
320	"	"	6.0'	9.0'	"	"	"	"	"	"
330	5.5'	8.5'	"	"	7.0'	10.0'	8.0'	11.0'	8.5'	11.5'
340	"	"	"	"	"	"	8.5'	11.5'	9.0'	12.0'
350	"	"	6.5'	9.5'	7.5'	10.5'	"	"	"	"
360	6.0'	9.0'	"	"	"	"	9.0'	12.0'	9.5'	12.5'
370	"	"	7.0'	10.0'	8.0'	11.0'	9.5'	12.5'	10.0'	13.0'
380	"	9.5'	"	"	"	11.5'	"	13.0'	10.5'	13.5'
390	6.5'	"	7.5'	10.5'	8.5'	"	10.0'	13.5'	11.0'	14.0'
400	"	10.0'	"	11.0'	9.0'	12.0'	10.5'	"	"	14.5'
410	7.0'	10.5'	"	"	"	12.5'	11.0'	14.0'	11.5'	15.0'
420	"	"	8.0'	11.5'	9.5'	13.0'	11.5'	15.0'	12.0'	16.0'
430	"	11.0'	8.5'	12.0'	10.0'	13.5'	"	15.5'	12.5'	16.5'
440	7.5'	11.5'	"	12.5'	"	14.0'	12.0'	16.0'	13.0'	17.0'
450	"	"	9.0'	13.0'	10.5'	14.5'	12.5'	16.5'	13.5'	17.5'
460	8.0'	12.0'	"	13.5'	11.0'	15.0'	13.0'	17.0'	14.0'	18.5'
470	"	12.5'	9.5'	"	"	15.5'	13.5'	18.0'	14.5'	19.0'
480	8.5'	13.0'	"	14.0'	11.5'	16.0'	14.0'	18.5'	15.0'	19.5'
490	"	"	10.0'	14.5'	12.0'	16.5'	14.5'	19.0'	15.5'	20.5'
500	9.0'	13.5'	10.5'	15.0'	13.0'	17.0'	15.0'	19.5'	16.5'	21.0'
510	9.5'	14.0'	11.0'	15.5'	13.5'	17.5'	16.0'	20.5'	17.0'	21.5'
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 18

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Heavy

POWER CONDUCTOR: No. 4 7/1 ACSR

TELEPHONE CONDUCTOR: .109 Grade 190 Steel

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	326' RULING SPAN		350' RULING SPAN		387' RULING SPAN		450' RULING SPAN		500' RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200	4.0'	7.0'	4.0'	7.0'	4.5'	7.5'	4.5'	8.0'	5.0'	8.0'
210	"	"	"	"	"	"	5.0'	"	5.5'	8.5'
220	"	"	4.5'	7.5'	5.0'	8.0'	5.5'	8.5'	"	"
230	"	"	"	"	"	"	"	"	"	"
240	4.5'	7.5'	"	"	"	"	"	"	6.0'	9.0'
250	"	"	5.0'	8.0'	5.5'	8.5'	6.0'	9.0'	6.5'	9.5'
260	"	"	"	"	"	"	6.5'	9.5'	"	"
270	5.0'	8.0'	"	"	6.0'	9.0'	"	"	7.0'	10.0'
280	"	"	5.5'	8.5'	"	"	7.0'	10.0'	"	"
290	"	"	"	"	6.5'	9.5'	"	"	7.5'	10.5'
300	"	"	6.0'	9.0'	"	"	7.5'	10.5'	8.0'	11.0'
310	5.5'	8.5'	"	"	7.0'	10.0'	"	"	"	"
320	"	"	"	"	"	"	8.0'	11.0'	8.5'	11.5'
330	6.0'	9.0'	6.5'	9.5'	7.5'	10.5'	8.5'	11.5'	9.0'	12.0'
340	"	"	"	"	"	"	"	"	9.5'	12.5'
350	"	"	7.0'	10.0'	8.0'	11.0'	9.0'	12.0'	"	"
360	6.5'	9.5'	"	"	"	"	9.5'	12.5'	10.0'	13.0'
370	"	"	7.5'	10.5'	8.5'	11.5'	10.0'	13.0'	10.5'	13.5'
380	7.0'	10.0'	"	"	9.0'	12.0'	10.5'	13.5'	11.0'	14.0'
390	"	"	8.0'	11.0'	"	"	"	"	11.5'	14.5'
400	"	"	"	"	9.5'	12.5'	11.0'	14.0'	12.0'	15.0'
410	7.5'	10.5'	8.5'	11.5'	10.0'	13.0'	11.5'	14.5'	12.5'	15.5'
420	"	"	"	"	"	"	12.0'	15.0'	13.0'	16.0'
430	8.0'	11.0'	9.0'	12.0'	10.5'	13.5'	12.5'	15.5'	13.5'	16.5'
440	"	11.5'	"	12.5'	11.0'	14.0'	13.0'	16.0'	14.0'	17.0'
450	8.5'	"	9.5'	13.0'	"	14.5'	13.5'	16.5'	14.5'	17.5'
460	"	12.0'	10.0'	13.5'	11.5'	15.0'	14.0'	17.0'	15.0'	
470	9.0'	12.5'	10.0'	"	12.0'	15.5'	"	17.5'	15.5'	
480	"	13.0'	10.5'	14.0'	12.5'	16.0'	14.5'		16.0'	
490	9.5'	"	11.0'	14.5'	13.0'	16.5'	15.0'		16.5'	
500	"	13.5'	"	15.0'	"	17.0'	15.5'		17.0'	
510	10.0'	14.0'	11.5'	15.5'	13.5'	17.5'	16.5'		17.5'	
520	10.5'	14.5'	12.0'	16.0'	14.0'		17.0'			
530	"	15.0'	12.5'	16.5'	14.5'		17.5'			
540	11.0'	15.5'	13.0'	17.0'						
550	"	16.0'	"	17.5'						
560	11.5'	"	14.0'							
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 19

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Heavy

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

...ion secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	354' RULING SPAN		375' RULING SPAN		416' RULING SPAN		450' RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200	3.5'	6.5'	3.5'	6.5'	4.0'	7.0'	4.0'	7.0'		
210	"	"	4.0'	7.0'	"	"	4.5'	7.5'		
220	"	"	"	"	"	"	"	"		
230	"	"	"	"	4.5'	7.5'	"	"		
240	"	"	"	"	"	"	"	"		
250	4.0'	7.0'	"	"	"	"	5.0'	8.0'		
260	"	"	"	"	"	"	"	"		
270	"	"	"	"	5.0'	8.0'	"	"		
280	"	"	4.5'	7.5'	"	"	5.5'	8.5'		
290	"	"	"	"	"	"	"	"		
300	"	"	"	"	5.5'	8.5'	6.0'	9.0'		
310	4.5'	7.5'	"	"	"	"	"	"		
320	"	"	5.0'	8.0'	"	"	6.5'	9.5'		
330	"	"	"	"	6.0'	9.0'	"	"		
340	"	"	"	"	"	"	"	"		
350	"	"	"	"	"	"	7.0'	10.0'		
360	5.0'	8.0'	5.5'	8.5'	6.5'	9.5'	"	"		
370	"	"	"	"	"	"	7.5'	10.5'		
380	"	"	"	"	7.0'	10.0'	"	11.0'		
390	"	8.5'	6.0'	9.0'	"	10.5'	8.0'	"		
400	5.5'	"	"	9.5'	7.5'	11.0'	8.5'	11.5'		
410	"	9.0'	"	"	"	"	"	12.0'		
420	"	"	6.5'	10.0'	8.0'	11.5'	9.0'	12.5'		
430	"	9.5'	"	10.5'	"	12.0'	"	13.0'		
440	6.0'	10.0'	"	"	8.5'	12.5'	9.5'	13.5'		
450	"	11.0'	7.0'	11.0'	9.0'	13.0'	"	14.0'		
460			"	11.5'	"	"	10.0'	14.5'		
470			7.5'	"	"	13.5'	10.5'	15.0'		
480			"	12.0'	9.5'	14.0'	"	15.5'		
490					10.0'	14.5'	11.0'	16.0'		
500					10.5'	15.0'	11.5'	16.5'		
510					11.0'	15.5'	12.0'	17.0'		
520					11.5'	16.0'	13.0'	17.5'		
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 20

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Heavy

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .109 Grade 190 Steel

...en secondaries are present or planned, use column "Secondary". All ...eparations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Fee									
	354' RULING SPAN		375' RULING SPAN		416' RULING SPAN		450' RULING SPAN		RULING SPA	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200	3.5'	6.5'	4.0'	7.0'	4.0'	7.0'	4.5'	7.5'		
210	"	"	"	"	"	"	"	"		
220	"	"	"	"	4.5'	7.5'	"	"		
230	4.0'	7.0'	"	"	"	"	"	"		
240	"	"	"	"	"	"	5.0'	8.0'		
250	"	"	4.5'	7.5'	5.0'	8.0'	"	"		
260	"	"	"	"	"	"	5.5'	8.5'		
270	"	"	"	"	"	"	"	"		
280	4.5'	7.5'	"	"	5.5'	8.5'	"	"		
290	"	"	5.0'	8.0'	"	"	6.0'	9.0'		
300	"	"	"	"	"	"	"	"		
310	"	"	"	"	6.0'	9.0'	6.5'	9.5'		
320	5.0'	8.0'	"	"	"	"	"	"		
330	"	"	5.5'	8.5'	6.5'	9.5'	7.0'	10.0'		
340	"	"	"	"	"	"	"	"		
350	"	"	6.0'	"	7.0'	10.0'	7.5'	10.5'		
360	5.5'	8.5'	"	9.0'	"	"	"	"		
370	"	"	"	"	7.5'	"	8.0'	11.0'		
380	"	"	"	"	"	10.5'	8.5'	11.5'		
390	6.0'	9.0'	6.5'	9.5'	8.0'	11.0'	"	"		
400	"	"	"	"	"	"	9.0'	12.0'		
410	"	"	7.0'	10.0'	8.5'	11.5'	"	"		
420	"	"	"	"	"	"	9.5'	12.5'		
430	6.5'	9.5'	"	10.5'	9.0'	12.0'	10.0'	13.0'		
440	"	"	7.5'	"	"	12.5'	"	13.5'		
450	"	10.0'	"	11.0'	9.5'	13.0'	10.5'	14.0'		
460			8.0'	11.5'	"	"	11.0'	14.5'		
470			"	"	10.0'	13.5'	"	15.0'		
480			8.5'	12.0'	10.5'	14.0'	11.5'	15.5'		
490					"	14.5'	12.0'	16.0'		
500					11.0'	15.0'	12.5'	16.5'		
510					"	15.5'	"	17.0'		
520					"	"	13.0'	17.5'		
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 21

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Heavy

POWER CONDUCTOR: No. 6 HD Copper

TELEPHONE CONDUCTOR: .109 Grade 190 Steel

secondaries are present or planned, use column "Secondary". All tions shown are between neutral and telephone conductors.

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

175' RULING SPAN		223' RULING SPAN		274' RULING SPAN		325' RULING SPAN		RULING SPAN	
LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
5.5'	8.5'	6.5'	9.5'	7.0'	10.5'	7.5'	10.5'		
"	"	7.0'	10.0'	7.5'	11.5'	8.0'	11.0'		
6.0'	9.0'	7.5'	10.5'	8.0'	11.0'	8.5'	11.5'		
6.5'	9.5'	8.0'	11.0'	8.5'	11.5'	9.0'	12.0'		
"	"	8.5'	11.5'	9.0'	12.0'	10.0'	13.0'		
7.0'	10.0'	9.0'	12.0'	10.0'	13.0'	10.5'	13.5'		
7.5'	10.5'	9.5'	12.5'	10.5'	13.5'	11.0'	14.0'		
"	"	10.0'	13.0'	11.0'	14.0'	11.5'	14.5'		
8.0'	11.0'	10.5'	13.5'	11.5'	14.5'	12.0'	15.0'		
8.5'	11.5'	11.0'	14.0'	12.0'	15.0'	12.5'	16.0'		
9.0'	12.0'	11.5'	14.5'	13.0'	16.0'	13.0'	16.5'		
"	"	12.0'	15.0'	13.5'	16.5'				
9.5'	12.5'	12.5'	15.5'						
10.0'	13.0'								
10.5'	13.5'								
11.0'	14.0'								
11.5'	14.5'								
12.0'	15.0'								
12.5'	15.5'								
13.0'	16.0'								

: The data shown in this table reflect the following basic minimum requirements:
-inch minimum separation at pole between neutral or secondary and highest telephone
nductor. (These tables do not include any consideration of minimum separation re-
irements when power equipment is mounted on pole below the neutral).
-inch minimum midspan separation between highest telephone conductor and neutral or
condaries.
ne of sight rule when secondaries up to 750 volts are involved.
l separations are based on REA pole head configurations with neutral 3½ feet below
le top and phase wires occupying a position at top of pole and lowest secondary 3
et below neutral.

RD-Fig. No. 22

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Heavy

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	345' RULING SPAN		375' RULING SPAN		400' RULING SPAN		450' RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200	3.5'	6.5'	4.0'	7.0'	4.0'	7.0'	4.5'	7.5'		
210	"	"	"	"	"	"	"	"		
220	"	"	"	"	4.5'	7.5'	5.0'	8.0'		
230	"	"	"	"	"	"	"	"		
240	4.0'	7.0'	4.5'	7.5'	"	"	"	"		
250	"	"	"	"	5.0'	8.0'	5.5'	8.5'		
260	"	"	"	"	"	"	"	"		
270	"	"	"	"	"	"	6.0'	9.0'		
280	"	"	5.0'	8.0'	5.5'	8.5'	"	"		
290	4.5'	7.5'	"	"	"	"	6.5'	9.5'		
300	"	"	"	"	6.0'	9.0'	"	"		
310	"	"	5.5'	8.5'	"	"	7.0'	10.0'		
320	"	"	"	"	"	"	"	"		
330	5.0'	8.0'	6.0'	9.0'	6.5'	9.5'	7.5'	10.5'		
340	"	"	"	"	"	"	"	"		
350	"	"	"	"	7.0'	10.0'	8.0'	11.0'		
360	"	"	6.5'	9.5'	"	"	"	"		
370	5.5'	8.5'	"	"	7.5'	10.5'	8.5'	11.5'		
380	"	"	"	"	"	"	9.0'	12.0'		
390	"	9.0'	7.0'	10.0'	8.0'	11.0'	9.5'	12.5'		
400	"	"	"	10.5'	"	11.5'	"	13.0'		
410	6.0'	9.5'	7.5'	"	8.5'	"	10.0'	13.5'		
420	"	"	"	11.0'	"	12.0'	"	14.0'		
430	"	10.0'	8.0'	11.5'	9.0'	12.5'	10.5'	14.5'		
440	6.5'	10.5'	"	12.0'	9.5'	13.0'	11.0'	15.0'		
450	"	"	8.5'	12.5'	"	13.5'	11.5'	15.5'		
460	"	11.0'	"	13.0'	10.0'	14.0'	12.0'	16.0'		
470	7.0'	"	9.0'	"	"	14.5'	"	16.5'		
480	"	11.5'	"	13.5'	10.5'	15.0'	12.5'	17.0'		
490	7.5'	12.0'	9.5'	14.0'	11.0'	"	13.0'	17.5'		
500	8.0'	"	10.0'	14.5'	11.5'	16.0'	14.0'	18.0'		
510	"	12.5'	10.5'	15.0'	12.0'	16.5'	14.5'	19.0'		
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 23

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Heavy

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .109 Grade 190 Steel

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	345' RULING SPAN		375' RULING SPAN		400' RULING SPAN		450' RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200	3.5'	6.5'	4.0'	7.0'	4.0'	7.0'	4.5'	7.5'		
210	"	"	"	"	4.5'	7.5'	5.0'	8.0'		
220	4.0'	7.0'	"	"	"	"	"	"		
230	"	"	4.5'	7.5'	5.0'	"	"	"		
240	"	"	"	"	"	8.0'	5.5'	8.5'		
250	"	"	"	"	"	"	"	"		
260	"	7.5'	5.0'	8.0'	5.5'	8.5'	6.0'	9.0'		
270	4.5'	"	"	"	"	"	"	"		
280	"	"	"	"	"	"	6.5'	9.5'		
290	"	"	5.5'	8.5'	6.0'	9.0'	"	"		
300	"	8.0'	"	"	"	"	7.0'	10.0'		
310	5.0'	"	"	"	6.5'	9.5'	"	"		
320	"	"	6.0'	9.0'	"	"	7.5'	10.5'		
330	"	"	"	"	7.0'	10.0'	8.0'	11.0'		
340	5.5'	8.5'	6.5'	9.5'	"	"	"	"		
350	"	"	"	"	7.5'	10.5'	8.5'	11.5'		
360	"	"	7.0'	10.0'	"	"	9.0'	12.0'		
370	6.0'	9.0'	"	"	8.0'	11.0'	9.5'	12.5'		
380	"	"	7.5'	10.5'	"	"	"	"		
390	"	"	"	"	8.5'	11.5'	10.0'	13.0'		
400	6.5'	9.5'	8.0'	11.0'	"	"	"	"		
410	"	"	"	"	9.0'	12.0'	10.5'	13.5'		
420	"	"	8.5'	11.5'	"	"	11.0'	14.0'		
430	7.0'	10.0'	"	"	9.5'	12.5'	"	14.5'		
440	"	"	9.0'	12.0'	10.0'	13.0'	11.5'	15.0'		
450	7.5'	10.5'	"	12.5'	10.5'	13.5'	12.0'	15.5'		
460	"	11.0'	9.5'	13.0'	"	14.0	12.5'	16.0'		
470	"	"	"	"	11.0'	14.5'	13.0'	16.5'		
480	8.0'	11.5'	10.0'	13.5'	11.5'	15.0'	13.5'	17.0'		
490	"	12.0'	10.5'	14.0'	"	15.5'	14.0'	17.5'		
500	8.5'	"	"	14.5'	12.0'	16.0'	14.5'			
510	"	12.5'	11.0'	15.0'	12.5'	16.5'	15.0'			
520	9.0'	13.0'	"	15.5'	13.0'	17.0'	15.5'			
530	"	13.5'	11.5'	16.0'	13.5'	"	16.0'			
540	9.5'	14.0'	12.0'	16.5'	14.0'		16.5'			
550	"	"	12.5'	17.0'	14.5'		17.0'			
560	10.0'	14.5'	13.0'	17.5'	15.0'		17.5'			
570	"	15.0'	13.5'		15.5'					
580	10.5'	15.5'	14.0'		16.0'					
590	"	16.0'	15.0'		16.5'					
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 24

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: 4 7/1 ACSR

TELEPHONE CONDUCTOR: .080 HS 40% Copperwel

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet									
	425' RULING SPAN		542' RULING SPAN		600' RULING SPAN		700' RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'		
260	"	"	"	"	"	"	"	"		
270	"	"	"	"	"	"				
280	"	"	"	"	"	"	4.0'	7.0'		
290	"	"	"	"	"	"	"	"		
300	"	"	"	"	"	"	"	"		
310	"	"	"	"	"	"	"	"		
320	"	"	"	"	"	"	"	"		
330	"	"	"	"	"	"	"	"		
340	"	"	"	"	"	"	4.5'	7.5'		
350	"	"	"	"	"	"	"	"		
360	"	"	"	"	4.0'	"	"	"		
370	"	"	"	"	"	7.0'	"	"		
380	"	"	"	"	"	"	"	8.0'		
390	"	"	"	7.0'	"	7.5'	5.0'	"		
400	"	7.0'	"	"	"	"	"	8.5'		
410	"	"	"	"	"	8.0'	"	"		
420	"	"	"	7.5'	"	"	"	9.0'		
430				"	4.5'	"	5.5'	"		
440										
450										
460										
470										
480										
490										
500										
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 25

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 4 7/1 ACSR

TELEPHONE CONDUCTOR: .102 EHS 30% Copperwel

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet									
	425' RULING SPAN		542' RULING SPAN		600' RULING SPAN		700' RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'	4.0'	7.0'		
260	"	"	"	"	"	"	"	"		
270	"	"	"	"	"	"	"	"		
280	"	"	"	"	"	"	"	"		
290	"	"	"	"	"	"	"	"		
300	"	"	"	"	4.0'	7.0'	4.5'	7.5'		
310	"	"	"	"	"	"	"	"		
320	"	"	"	"	"	"	"	"		
330	"	"	"	"	"	"	"	"		
340	"	"	"	"	"	"	"	"		
350	"	"	"	"	"	"	5.0'	8.0'		
360	"	"	"	"	"	"	"	"		
370	"	"	4.0'	7.0'	4.5'	7.5'	"	"		
380	"	"	"	"	"	"	"	8.5'		
390	"	7.0'	"	"	"	"	5.5'	"		
400	"	"	"	7.5'	"	8.0'	"	9.0'		
410	"	"	"	"	"	"	"	"		
420	4.0'	7.5'	"	8.0'	5.0'	8.5'	6.0'	9.5'		
430	"	"	4.5'	"	"	"	"	"		
440	"	"	"	"	"	9.0'	"	10.0'		
450	"	8.0'	"	8.5'	"	"	"	10.5'		
460	"	"	"	"	"	9.5'	6.5'	"		
470	"	8.5'	"	9.0'	"	"	"	11.0'		
480	"	"	"	"	5.5'	10.0'	"	11.5'		
490	"	9.0'	"	9.5'	"	"	7.0'	"		
500	"	"	5.0'	"	"	10.5'	"	12.0'		
510	"	9.5'	"	10.0'	"	11.0'	7.5'	12.5'		
520	"	"	"	"	6.0'	"	"	"		
530	"	10.0'	"	10.5'	"	11.5'	"	13.0'		
540	4.5'	"	"	"	"	"	"	13.5'		
550	"	10.5'	"	11.0'	"	12.0'	8.0'	14.0'		
560	"	"	"	11.5'	6.5'	12.5'	"	"		
570	"	11.0'	5.5'	"	"	"	8.5'	14.5'		
580	"	"	"	12.0'	"	13.0'	"	15.0'		
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 26

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT	POWER CONDUCTOR
Medium	No. 4-7/1 ACSR
	TELEPHONE CONDUCTOR
	.109 Grade 135 Steel

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Fee									
	425' RULING SPAN		542' RULING SPAN		600' RULING SPAN		700' RULING SPAN		RULING SPA	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250.	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'	4.0'	7.0'		
260	"	"	"	"	"	"	"	"		
270	"	"	"	"	"	"	"	"		
280	"	"	"	"	"	"	"	"		
290	"	"	"	"	4.0'	"	4.5'	"		
300	"	"	"	"	"	7.0'	"	"		
310	"	"	"	"	"	"	"	7.5'		
320	"	"	"	"	"	"	"	"		
330	"	"	"	"	"	"	"	"		
340	"	"	4.0'	"	"	"	5.0'	8.0'		
350	"	"	"	"	4.5'	"	"	"		
360	"	"	"	7.0'	"	"	"	"		
370	"	"	"	"	"	7.5'	"	"		
380	"	"	"	"	"	"	5.5'	8.5'		
390	"	"	"	"	"	"	"	"		
400	4.0'	7.0'	"	"	"	8.0'	"	9.0'		
410	"	"	4.5'	7.5'	5.0'	"	6.0'	"		
420	"	7.5'	"	"	"	"	"	"		
430	"	"	"	8.0'	"	8.5'	"	9.5'		
440	"	"	"	"	"	"	6.5'	10.0'		
450	"	8.0'	"	8.5'	"	9.0'	"	"		
460	"	"	"	"	5.5'	"	"	10.5'		
470	"	8.5'	"	9.0'	"	9.5'	7.0'	11.0'		
480	4.5'	"	5.0'	"	"	"	"	"		
490	"	9.0'	"	9.5'	"	10.0'	"	11.5'		
500	"	"	"	"	6.0'	"	7.5'	12.0'		
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 27

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 4 7/1 ACSR

TELEPHONE CONDUCTOR: .109 Grade 190 Steel

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	425' RULING SPAN		512' RULING SPAN		600' RULING SPAN		700' RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'	4.0'	7.0'		
260	"	"	"	"	4.0'	7.0'	"	"		
270	"	"	"	"	"		4.5'	7.5'		
280	"	"	"	"	"	"	"	"		
290	"	"	"	"	"	"	"	"		
300	"	"	4.0'	7.0'	"	"	"	"		
310	"	"	"	"	"	"	5.0'	8.0'		
320	"	"	"	"	4.5'	7.5'	"	"		
330	4.0'	7.0'	"	"	"	"	"	"		
340	"	"	"	"	"	"	"	"		
350	"	"	"	"	"	"	5.5'	8.5'		
360	"	"	4.5'	7.5'	"	"	"	"		
370	"	"	"	"	5.0'	8.0'	"	"		
380	"	"	"	"	"	"	6.0'	9.0'		
390	"	"	"	"	"	"	"	"		
400	"	"	"	"	"	"	"	"		
410	4.5'	7.5'	"	"	5.5'	8.5'	6.5'	9.5'		
420	"	"	5.0'	8.0'	"	"	"	"		
430	"	"	"	"	"	"	"	"		
440	"	"	"	"	"	9.0'	7.0'	10.0'		
450	"	8.0'	"	8.5'	6.0'	"	"	"		
460	"	"	"	"	"	9.5'	"	10.5'		
470	5.0'	"	5.5'	9.0'	"	"	7.5'	11.0'		
480	"	8.5'	"	"	"	10.0'	"	"		
490	"	"	"	9.5'	6.5'	"	8.0'	11.5'		
500	"	9.0'	"	"	"	10.5'	"	12.0'		
510	"	"	6.0'	10.0'	"	"	"	"		
	5.5'	9.5'	"	"	7.0'	11.0'	8.5'	12.5'		
	"	"	"	10.5'	"	"	"	13.0'		
			"	"	"	11.5'	9.0'	"		
			6.5'	11.0'	7.5'	12.0'	"	13.5'		
			"	"	"	"	9.5'	14.0'		
			"	11.5'	"	12.5'	"	14.5'		
			"	"	8.0'	13.0'	10.0'	15.0'		
			7.0'	12.0'	"	"	"	"		

in this table reflect the following basic minimum requirements:
ration at pole between neutral or secondary and highest telephone
bles do not include any consideration of minimum separation re-
r equipment is mounted on pole below the neutral).
pan separation between highest telephone conductor and neutral or

hen secondaries up to 750 volts are involved.
based on REA pole head configurations with neutral 3½ feet below
ires occupying a position at top of pole and lowest secondary 3

RD-Fig. No. 28

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .080 HS 40% Copperweld

...on secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	450' RULING SPAN		500' RULING SPAN		575' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
260	"	"	"	"	"	"				
270	"	"	"	"	"	"				
280	"	"	"	"	"	"				
290	"	"	"	"	"	"				
300	"	"	"	"	"	"				
310	"	"	"	"	"	"				
320	"	"	"	"	"	"				
330	"	"	"	"	"	"				
340	"	"	"	"	"	"				
350	"	"	"	"	"	"				
360	"	"	"	"	"	"				
370	"	"	"	"	"	"				
380	"	"	"	"	"	"				
390	"	"	"	"	"	"				
400	"	"	"	"	"	7.0'				
410	"	"	"	"	"	"				
420	"	7.0'	"	7.0'	"	"				
430										
440										
450										
460										
470										
480										
490										
500										
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondar[illegible] feet below neutral.

RD-Fig. No. 29

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	450' RULING SPAN		500' RULING SPAN		575' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
260	"	"	"	"	"	"				
270	"	"	"	"	"	"				
280	"	"	"	"	"	"				
290	"	"	"	"	"	"				
300	"	"	"	"	"	"				
310	"	"	"	"	"	"				
320	"	"	"	"	"	"				
330	"	"	"	"	"	"				
340	"	"	"	"	"	"				
350	"	"	"	"	"	"				
360	"	"	"	"	"	"				
370	"	"	"	"	"	"				
380	"	"	"	"	"	"				
390	"	"	"	"	"	"				
400	"	"	"	"	"	7.0'				
410	"	"	"	"	"	"				
420	"	"	"	7.0'	"	"				
430	"	7.0'	"	"	"	7.5'				
440	"	"	"	"	"	"				
450	"	"	"	7.5'	"	"				
460	"	"	"	"	"	8.0'				
470	"	7.5'	"	8.0'	"	"				
480	"	"	"	"	"	8.5'				
490	"	8.0'	"	"	"	"				
500	"	"	"	8.5'	4.0'	"				
510	"	8.5'	"	"	"	9.0'				
520	"	"	"	9.0'	"	"				
530	"	9.0'	"	"	"	9.5'				
540	"	"	"	9.5'	"	"				
550	"	9.5'	"	"	"	10.0'				
560	"	"	"	"	"	"				
570	"	10.0'	"	10.0'	"	10.5'				
580	"	"	"	"	"	"				
590	"	10.5'	"	10.5'	"	11.0'				
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 30

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .109 Grade 135 Steel

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet

SPAN LENGTH FT.	450' RULING SPAN		500' RULING SPAN		575' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
260	"	"	"	"	"	"				
270	"	"	"	"	"	"				
280	"	"	"	"	"	"				
290	"	"	"	"	"	"				
300	"	"	"	"	"	"				
310	"	"	"	"	"	"				
320	"	"	"	"	"	"				
330	"	"	"	"	"	"				
340	"	"	"	"	"	"				
350	"	"	"	"	"	"				
360	"	"	"	"	"	"				
370	"	"	"	"	"	"				
380	"	"	"	"	"	"				
390	"	"	"	"	"	"				
400	"	"	"	"	"	7.0'				
410	"	"	"	"	"	"				
420	"	7.0'	"	7.0'	"	"				
430	"	"	"	"	"	7.5'				
440	"	"	"	"	"	"				
450	"	7.5'	"	7.5'	4.0'	"				
460	"	"	"	"	"	8.0'				
470	"	"	"	8.0'	"	"				
480	"	8.0'	"	"	"	"				
490	"	"	"	"	"	8.5'				
500	"	"	"	8.5'	"	"				
510	"	8.5'	4.0'	"	"	9.0'				
520	"	"	"	9.0'	"	"				
530	"	9.0'	"	"	"	9.5'				
540	"	"	"	"	4.5'	"				
550	"	9.5'	"	9.5'	"	10.0'				
560	4.0'	"	"	"	"	"				
570	"	10.0'	"	10.0'	"	10.5'				
580	"	"	"	"	"	"				
590	"	10.5'	"	10.5'	"	11.0'				
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 vol
4. All separations are based on REA pole head confi
   pole top and phase wires occupying a position a
   feet below neutral.

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .109 Grade 190 Steel

On secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	450' RULING SPAN		500' RULING SPAN		575' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
260	"	"	"	"	"	"				
270	"	"	"	"	"	"				
280	"	"	"	"	"	"				
290	"	"	"	"	"	"				
300	"	"	"	"	"	"				
310	"	"	"	"	"	"				
320	"	"	"	"	"	"				
330	"	"	"	"	"	"				
340	"	"	"	"	"	"				
350	"	"	"	"	"	"				
360	"	"	"	"	4.0'	7.0'				
370	"	6.5'	"	"	"	"				
380	"	"	"	"	"	"				
390	"	"	4.0'	7.0'	"	"				
400	"	"	"	"	"	"				
410	4.0'	7.0'	"	"	"	"				
420	"	"	"	"	"	"				
430	"	"	"	"	"	7.5'				
440	"	"	"	"	"	"				
450	"	7.5'	"	7.5'	4.5'	"				
460	"	"	"	"	"	8.0'				
470	"	"	"	8.0'	"	"				
480	"	8.0'	4.5'	"	"	8.5'				
490	"	"	"	"	"	"				
500	"	"	"	8.5'	"	"				
510	4.5'	8.5'	"	"	5.0'	9.0'				
520	"	"	"	9.0'	"	"				
530	"	9.0'	"	"	"	9.5'				
540	"	"	"	"	"	"				
550	"	9.5'	"	9.5'	"	10.0'				
560	"	"	5.0'	"	"	"				
570	"	10.0'	"	10.0'	5.5'	10.5'				
580	5.0'	"	"	"	"	"				
590	"	10.5'	"	10.5'	"	11.0'				
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 32

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 6 HD Copper

TELEPHONE CONDUCTOR: .080 HS 40% Copperweld

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	330' RULING SPAN		350' RULING SPAN		395' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	4.5'	7.5'	4.5'	7.5'	5.0'	8.0'				
260	"	"	5.0'	8.0'	5.5'	8.5'				
270	"	"	"	"	"	"				
280	5.0'	8.0'	"	"	"	"				
290	"	"	5.5'	8.5'	6.0'	9.0'				
300	"	"	"	"	"	"				
310	5.5'	8.5'	6.0'	9.0'	6.5'	9.5'				
320	"	"	"	"	"	"				
330	"	"	"	"	7.0'	"				
340	6.0'	9.0'	6.5'	9.5'	"	10.0'				
350	"	"	"	"	7.5'	10.5'				
360	6.5'	9.5'	"	10.0'	"	"				
370	"	10.0'	7.0'	10.5'	8.0'	11.0'				
380	"	"	"	"	"	11.5'				
390	7.0'	10.5'	7.5'	11.0'	8.5'	12.0'				
400	"	11.0'	"	11.5'	"	12.5'				
410	7.5'	"	8.0'	12.0'	9.0'	13.0'				
420	"	11.5'	"	"	9.5'	13.5'				
430										
440										
450										
460										
470										
480										
490										
500										
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 33

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 6 HD Copper

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

...secondaries are present or planned, use column "Secondary". All ...erations shown are between neutral and telephone conductors.

SPAN LGTH T.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	330' RULING SPAN		350' RULING SPAN		395' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
00										
10										
20										
30										
40										
50	4.5'	7.5'	5.0'	8.0'	5.0'	8.0'				
60	5.0'	8.0'	"	"	5.5'	8.5'				
70	"	"	"	"	"	"				
80	"	"	5.5'	8.5'	6.0'	9.0'				
90	5.5'	8.5'	"	"	"	"				
00	"	"	6.0'	9.0'	6.5'	9.5'				
10	"	"	"	"	"	"				
20	6.0'	9.0'	"	"	7.0'	10.0'				
30	"	"	6.5'	9.5'	"	"				
40	"	"	"	"	7.5'	10.5'				
50	6.5'	9.5'	7.0'	10.0'	"	"				
60	"	"	"	"	8.0'	11.0'				
70	7.0'	10.0'	7.5'	10.5'	"	"				
80	"	"	"	"	8.5'	11.5'				
90	7.5'	10.5'	8.0'	11.0'	9.0'	12.0'				
00	"	11.0'	"	11.5'	"	12.5'				
10	8.0'	"	8.5'	12.0'	9.5'	13.0'				
20	"	11.5'	"	12.5'	10.0'	13.5'				
30	8.5'	12.0'	9.0'	13.0'	"	14.0'				
40	"	12.5'	9.5'	"	10.5'	14.5'				
50			"	13.5'	11.0'	15.0'				
60			10.0'	14.0'	"	15.5'				
70					11.5'	16.0'				
80					12.0'	16.5'				
90					12.5'	17.0'				
00					13.0'	17.5'				
10					13.5'	18.0'				
20										
30										
40										
50										
60										
70										
80										
90										
00										

...ES: The data shown in this table reflect the following basic minimum requirements:
...40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
...C-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
Line of sight rule when secondaries up to 750 volts are involved.
All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 34

ERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 6 HD Copper

TELEPHONE CONDUCTOR: .109 Grade 135 Steel

condaries are present or planned, use column "Secondary". All tions shown are between neutral and telephone conductors.

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

330' RULING SPAN		350' RULING SPAN		395' RULING SPAN		RULING SPAN		RULING SPAN	
LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
4.5'	7.5'	5.0'	8.0'	5.5'	8.5'				
5.0'	8.0'	"	"	"	"				
"	"	"	"	"	"				
"	"	5.5'	8.5'	6.0'	9.0'				
5.5'	8.5'	"	"	"	"				
"	"	6.0'	9.0'	6.5'	9.5'				
"	"	"	"	"	"				
6.0'	9.0'	6.5'	9.5'	7.0'	10.0'				
"	"	"	"	"	"				
6.5'	9.5'	7.0'	10.0'	7.5'	10.5'				
"	"	"	"	8.0'	11.0'				
"	10.0'	7.5'	10.5'	"	"				
7.0'	"	"	"	8.5'	11.5'				
"	10.5'	8.0'	11.0'	"	"				
7.5'	"	"	"	9.0'	12.0'				
8.0'	11.0'	8.5'	11.5'	9.5'	12.5'				
"	"	"	12.0'	"	13.0'				
8.5'	11.5'	9.0'	12.5'	10.0'	13.5'				
"	12.0'	"	13.0'	10.5'	14.0'				
9.0'	12.5'	9.5'	"	"	14.5'				
		10.0'	13.5'	11.0'	15.0'				
		"	14.0'	11.5'	15.5'				
				12.0'	16.0'				
				"	16.5'				
				12.5'	17.0'				
				13.0'	17.5'				
				13.5'	18.0'				

s: The data shown in this table reflect the following basic minimum requirements:
)-inch minimum separation at pole between neutral or secondary and highest telephone onductor. (These tables do not include any consideration of minimum separation re-uirements when power equipment is mounted on pole below the neutral).
)-inch minimum midspan separation between highest telephone conductor and neutral or econdaries.
ine of sight rule when secondaries up to 750 volts are involved.
ll separations are based on REA pole head configurations with neutral 3½ feet below ole top and phase wires occupying a position at top of pole and lowest secondary 3 eet below neutral.

RD-Fig. No. 35

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT	POWER CONDUCTOR
Medium	No. 6 HD Copper
	TELEPHONE CONDUCTOR
	.109 Grade 190 Steel

Where secondaries are present or planned, use colum "Secondary". All separations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	330' RULING SPAN		350' RULING SPAN		395' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	5.0'	8.0'	5.0'	8.0'	5.5'	8.5'				
260	"	"	5.5'	8.5'	"	"				
270	"	"	"	"	6.0'	9.0'				
280	5.5'	8.5'	"	"	"	"				
290	"	"	6.0'	9.0'	6.5'	9.5'				
300	6.0'	9.0'	"	"	"	"				
310	"	"	6.5'	9.5'	7.0'	10.0'				
320	"	"	"	"	"	"				
330	6.5'	9.5'	7.0'	10.0'	7.5'	10.5'				
340	"	"	"	"	8.0'	11.0'				
350	7.0'	10.0'	7.5'	10.5'	"	"				
360	"	"	"	"	8.5'	11.5'				
370	7.5'	10.5'	8.0'	11.0'	"	"				
380	"	"	"	"	9.0'	12.0'				
390	8.0'	11.0'	8.5'	11.5'	9.5'	12.5'				
400	"	"	"	"	"	"				
410	8.5'	11.5'	9.0'	12.0'	10.0'	13.0'				
420	9.0'	12.0'	9.5'	12.5'	10.5'	13.5'				
430	"	"	"	"	11.0'	14.0'				
440	9.5'	12.5'	10.0'	13.0'	"	14.5'				
450	"	13.0'	10.5'	13.5'	11.5'	15.0'				
460	10.0'	13.5'	"	14.0'	12.0'	15.5'				
470	"	14.0'	11.0'	14.5'	12.5'	16.0'				
480	10.5'	"	11.5'	15.0'						
490	11.0'	14.5'	12.0'	15.5'						
500	"	15.0'	"	16.0'						
510	11.5'	15.5'	12.5'	16.5'						
520	12.0'	16.0'								
530	12.5'	16.5'								
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:
40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
Line of sight rule when secondaries up to 750 volts are involved.
All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 36

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .080 HS 40% Copperweld

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet									
	465' RULING SPAN		500' RULING SPAN		590' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
260	"	"	"	"	"	"				
270	"	"	"	"	"	"				
280	"	"	"	"	"	"				
290	"	"	"	"	"	"				
300	"	"	"	"	"	"				
310	"	"	"	"	"	"				
320	"	"	"	"	"	"				
330	"	"	"	"	"	"				
340	"	"	"	"	"	"				
350	"	"	"	"	"	"				
360	"	"	"	"	"	"				
370	"	"	"	"	"	"				
380	"	"	"	"	"	"				
390	"	"	"	"	"	"				
400	"	"	"	"	"	"				
410	"	"	"	"	"	"				
420	"	"	"	"	"	7.0'				
430										
440										
450										
460										
470										
480										
490										
500										
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 37

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

...en secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	465' RULING SPAN LOWER POWER COND.		500' RULING SPAN LOWER POWER COND.		590' RULING SPAN LOWER POWER COND.		RULING SPAN LOWER POWER COND.		RULING SPAN LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
260	"	"	"	"	"	"				
270	"	"	"	"	"	"				
280	"	"	"	"	"	"				
290	"	"	"	"	"	"				
300	"	"	"	"	"	"				
310	"	"	"	"	"	"				
320	"	"	"	"	"	"				
330	"	"	"	"	"	"				
340	"	"	"	"	"	"				
350	"	"	"	"	"	"				
360	"	"	"	"	"	"				
370	"	"	"	"	"	"				
380	"	"	"	"	"	"				
390	"	"	"	"	"	"				
400	"	"	"	"	"	"				
410	"	"	"	"	"	"				
420	"	"	"	"	"	7.0'				
430	"	"	"	"	"	"				
440	"	"	"	7.0'	"	"				
450	"	7.0'	"	"	"	7.5'				
460	"	"	"	"	"	"				
470	"	"	"	7.5'	"	8.0'				
480	"	7.5'	"	"	"	"				
490	"	"	"	"	"	"				
500	"	"	"	8.0'	"	8.5'				
510	"	8.0'	"	"	"	"				
520	"	"	"	"	"	9.0'				
530	"	"	"	8.5'	"	"				
540	"	8.5'	"	"	"	"				
550	"	"	"	9.0'	"	9.5'				
560	"	9.0'	"	"	"	"				
570	"	"	"	"	"	10.0'				
580	"	"	"	9.5'	"	"				
590	"	9.5'	"	"	4.0'	10.5'				
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 38

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .109 Grade 135 Steel

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	465' RULING SPAN		500' RULING SPAN		590' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
260	"	"	"	"	"	"				
270	"	"	"	"	"	"				
280	"	"	"	"	"	"				
290	"	"	"	"	"	"				
300	"	"	"	"	"	"				
310	"	"	"	"	"	"				
320	"	"	"	"	"	"				
330	"	"	"	"	"	"				
340	"	"	"	"	"	"				
350	"	"	"	"	"	"				
360	"	"	"	"	"	"				
370	"	"	"	"	"	"				
380	"	"	"	"	"	"				
390	"	"	"	"	"	"				
400	"	"	"	"	"	"				
410	"	"	"	"	"	"				
420	"	"	"	"	"	7.0'				
430	"	"	"	"	"	"				
440	"	"	"	7.0'	"	"				
450	"	7.0'	"	"	"	7.5'				
460	"	"	"	"	"	"				
470	"	"	"	7.5'	"	8.0'				
480	"	7.5'	"	"	"	"				
490	"	"	"	"	"	"				
500	"	"	"	8.0'	"	8.5'				
510	"	8.0'	"	"	4.0'	"				
520	"	"	"	"	"	9.0'				
530	"	"	"	8.5'	"	"				
540	"	8.5'	"	"	"	"				
550	"	"	"	9.0'	"	9.5'				
560	"	9.0'	"	"	"	"				
570	"	"	"	"	"	10.0'				
580	"	"	"	9.5'	4.5'	"				
590	"	9.5'	"	"	"	10.5'				
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 39

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

secondaries are present or planned, use column "Secondary". All rations shown are between neutral and telephone conductors.

LOADING DISTRICT: Medium

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .109 Grade 190 Steel

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

AN TH	465' RULING SPAN		500' RULING SPAN		590' RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
0										
0										
0										
0										
0										
0	3.5'	6.5'	3.5'	6.5'	3.5'	6.5'				
0	"	"	"	"	"	"				
0	"	"	"	"	"	"				
0	"	"	"	"	"	"				
0	"	"	"	"	"	"				
0	"	"	"	"	"	"				
0	"	"	"	"	"	"				
0	"	"	"	"	"	"				
	"	"	"	"	"	"				
	"	"	"	"	"	"				

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT	POWER CONDUCTOR	TELEPHONE CONDUCTOR
Light	No. 4 7/1 ACSR	.080 40% HS Copperweld

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	495' RULING SPAN		650' RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'	3.5'	6.5'						
310	"	"	"	"						
320	"	"	"	"						
330	"	"	"	"						
340	"	"	"	"						
350	"	"	"	"						
360	"	"	"	"						
370	"	"	"	"						
380	"	"	"	"						
390	"	"	"	"						
400	"	"	"	"						
410	"	"	"	"						
420	"	"	"	"						
430	"	"	"	"						
440	"	"	"	"						
450	"	7.0'	"	"						
460	"	"	"	7.0'						
470	"	"	"	"						
480	"	"	"	"						
490	"	7.5'	"	7.5'						
500	"	"	"	"						
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with no pole top and phase wires occupying a position at top of pole and feet below neutral.

RD-Fig.

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 4 7/1 ACSR

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

...ien secondaries are present or planned, use column "Secondary". All ...separations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet									
	495' RULING SPAN		650' RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'	3.5'	6.5'						
310	"	"	"	"						
320	"	"	"	"						
330	"	"	"	"						
340	"	"	"	"						
350	"	"	"	"						
360	"	"	"	"						
370	"	"	"	"						
380	"	"	"	"						
390	"	"	"	"						
400	"	"	"	"						
410	"	"	"	"						
420	"	"	"	"						
430	"	"	"	"						
440	"	"	"	"						
450	"	7.0'	"	"						
460	"	"	"	7.0'						
470	"	"	"	"						
480	"	"	"	"						
490	"	7.5'	"	7.5'						
500	"	"	"	"						
510	"	8.0'	"	"						
520	"	"	"	8.0'						
530	"	"	"	"						
540	"	8.5'	"	"						
550	"	"	"	8.5'						
560	"	9.0'	"	"						
570	"	"	"	9.0'						
580	"	"	"	"						
590	"	9.5'	"	"						
600	"	"	"	10.0'						

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 42

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 4 7/1 ACSR

TELEPHONE CONDUCTOR: .109 Grade 135 Steel

hen secondaries are present or planned, use column "Secondary". All perations shown are between neutral and telephone conductors.

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Fee

SPAN LENGTH FT.	495' RULING SPAN		650' RULING SPAN		RULING SPAN		RULING SPAN		RULING SPA	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDAR
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'	3.5'	6.5'						
310	"	"	"	"						
320	"	"	"	"						
330	"	"	"	"						
340	"	"	"	"						
350	"	"	"	"						
360	"	"	"	"						
370	"	"	"	"						
380	"	"	"	"						
390	"	"	"	"						
400	"	"	"	"						
410	"	"	"	"						
420	"	"	"	"						
430	"	"	"	"						
440	"	"	"	"						
450	"	7.0'	"	"						
460	"	"	"	7.0'						
470	"	"	"	"						
480	"	7.5'	"	"						
490	"	"	"	7.5'						
500	"	"	"	"						
510	"	8.0'	"	"						
520	"	"	"	8.0'						
530	"	"	"	"						
540	"	8.5'	"	"						
550	"	"	"	8.5'						
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephon conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral / secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet be pole top and phase wires occupying a position at top of pole and lowest secondary feet below neutral.

RD-Fig. No. 43

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .080 HS 40% Copperweld

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	"	"								
360	"	"								
370	"	"								
380	"	"								
390	"	"								
400	"	"								
410	"	"								
420	"	"								
430	"	7.0'								
440	"	"								
450	"	"								
460										
470										
480										
490										
500										
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 44

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	"	"								
360	"	"								
370	"	"								
380	"	"								
390	"	"								
400	"	"								
410	"	"								
420	"	"								
430	"	7.0'								
440	"	"								
450	"	"								
460	"	7.5'								
470	"	"								
480	"	8.0'								
490	"	"								
500	"	"								
510	"	8.5'								
520	"	"								
530	"	9.0'								
540	"	"								
550	"	"								
560	"	9.5'								
570	"	"								
580	"	10.0'								
590	"	"								
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 45

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

secondaries are present or planned, use column "Secondary". All ations shown are between neutral and telephone conductors.

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 6A Copperweld

TELEPHONE CONDUCTOR: .109 Grade 135 Steel

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	All RULING SPANS — LOWER POWER COND.		RULING SPAN — LOWER POWER COND.		RULING SPAN — LOWER POWER COND.		RULING SPAN — LOWER POWER COND.		RULING SPAN — LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	"	"								
360	"	"								
370	"	"								
380	"	"								
390	"	"								
[illegible]	"	"								
	"	"								
[illegible]20	"	"								
430	"	7.0'								
440	"	"								
450	"	"								
460	"	7.5'								
470	"	"								
480	"	8.0'								
490	"	"								
500	"	"								
510	"	8.5'								
520	"	"								
530	"	9.0'								
540	"	"								
550	"	"								
560	"	9.5'								
570	"	"								
580	4.0'	10.0'								
590	"	"								
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or econdaries.

ne of sight rule when secondaries up to 750 volts are involved.

4 .11 separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 46

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 6 HD Copper

TELEPHONE CONDUCTOR: .080 HS 40% Copperwel

n secondaries are present or planned, use column "Secondary". All arations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Fee									
	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPA	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	4.0'	7.0'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	"	"								
360	"	"								
370	"	7.5'								
380	4.5'	"								
390	"	8.0'								
00	"	"								
410	"	8.5'								
420	"	"								
430	"	9.0'								
440	"	"								
450	5.0'	9.5'								
460										
470										
480										
490										
500										
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation .e- quirements when power equipment is mounted on pole below the neutral).
   30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 47

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 6 HD Copper

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	4.0'	7.0'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	4.5'	7.5'								
360	"	"								
370	"	"								
380	"	"								
390	5.0'	8.0'								
400	"	"								
410	"	8.5'								
420	"	"								
430	"	9.0'								
440	5.5'	"								
450	"	9.5'								
460	"	10.0'								
470	"	"								
480	6.0'	10.5'								
490	"	"								
500	"	11.0'								
510	"	"								
520	6.5'	11.5'								
530	"	12.0'								
540	"	"								
550	"	12.5'								
560	7.0'	13.0'								
570	"	13.5'								
580	"	"								
590	7.5'	14.0'								
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 48

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 6 HD Copper

TELEPHONE CONDUCTOR: .109 Grade 135 Steel

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	4.0'	7.0'								
310	"	"								
320	"	"								
330	4.5'	7.5'								
340	"	"								
350	"	"								
360	"	"								
370	"	"								
380	5.0'	8.0'								
390	"	"								
400	"	"								
410	"	8.5'								
420	5.5'	"								
430	"	9.0'								
440	"	"								
450	"	9.5'								
460	6.0'	10.0'								
470	"	"								
480	"	10.5'								
490	"	"								
500	6.5'	11.0'								
510	"	11.5'								
520	"	"								
530	7.0'	12.0'								
540	"	12.5'								
550	"	"								
560	7.5'	13.0'								
570	"	13.5'								
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 49

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT	POWER CONDUCTOR
Light	No. 6 HD Copper
	TELEPHONE CONDUCTOR
	.109 Grade 190 Steel

secondaries are present or planned, use column "Secondary". All rations shown are between neutral and telephone conductors.

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet									
	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	4.5'	7.5'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	5.0'	8.0'								
360	"	"								
370	"	"								
380	"	"								
390	5.5'	8.5'								
0	"	"								
-0	"	"								
420	6.0'	9.0'								
430	"	"								
440	"	"								
450	"	9.5'								
460	6.5'	10.0'								
470	"	"								
480	"	10.5'								
490	7.0'	"								
500	"	11.0'								
510	"	11.5'								
520	7.5'	"								
530	"	12.0'								
540	"	12.5'								
550	8.0'	"								
560	"	13.0'								
570	8.5'	13.5'								
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 50

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .080 HS 40% Copperweld

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	"	"								
360	"	"								
370	"	"								
380	"	"								
390	"	"								
400	"	"								
410	"	"								
420	"	"								
430	"	"								
440	"	"								
450	"	"								
460										
470										
480										
490										
500										
510										
520										
530										
540										
550										
560										
570										
580										
590										
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 51

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 8A Copperweld

TELEPHONE CONDUCTOR: .102 EHS 30% Copperweld

Where secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)

SPAN LENGTH FT.	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	"	"								
360	"	"								
370	"	"								
380	"	"								
390	"	"								
400	"	"								
410	"	"								
420	"	"								
430	"	"								
440	"	"								
450	"	7.0'								
460	"	"								
470	"	"								
480	"	7.5'								
490	"	"								
500	"	"								
510	"	8.0'								
520	"	"								
530	"	"								
540	"	8.5'								
550	"	"								
560	"	9.0'								
570	"	"								
580	"	"								
590	"	9.5'								
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3¼ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 52

VERTICAL SEPARATION TABLES FOR TELEPHONE UNDERBUILD ON REA ELECTRIC POLE LINES

When secondaries are present or planned, use column "Secondary". All separations shown are between neutral and telephone conductors.

LOADING DISTRICT: Light

POWER CONDUCTOR: No. 8A Copperweld

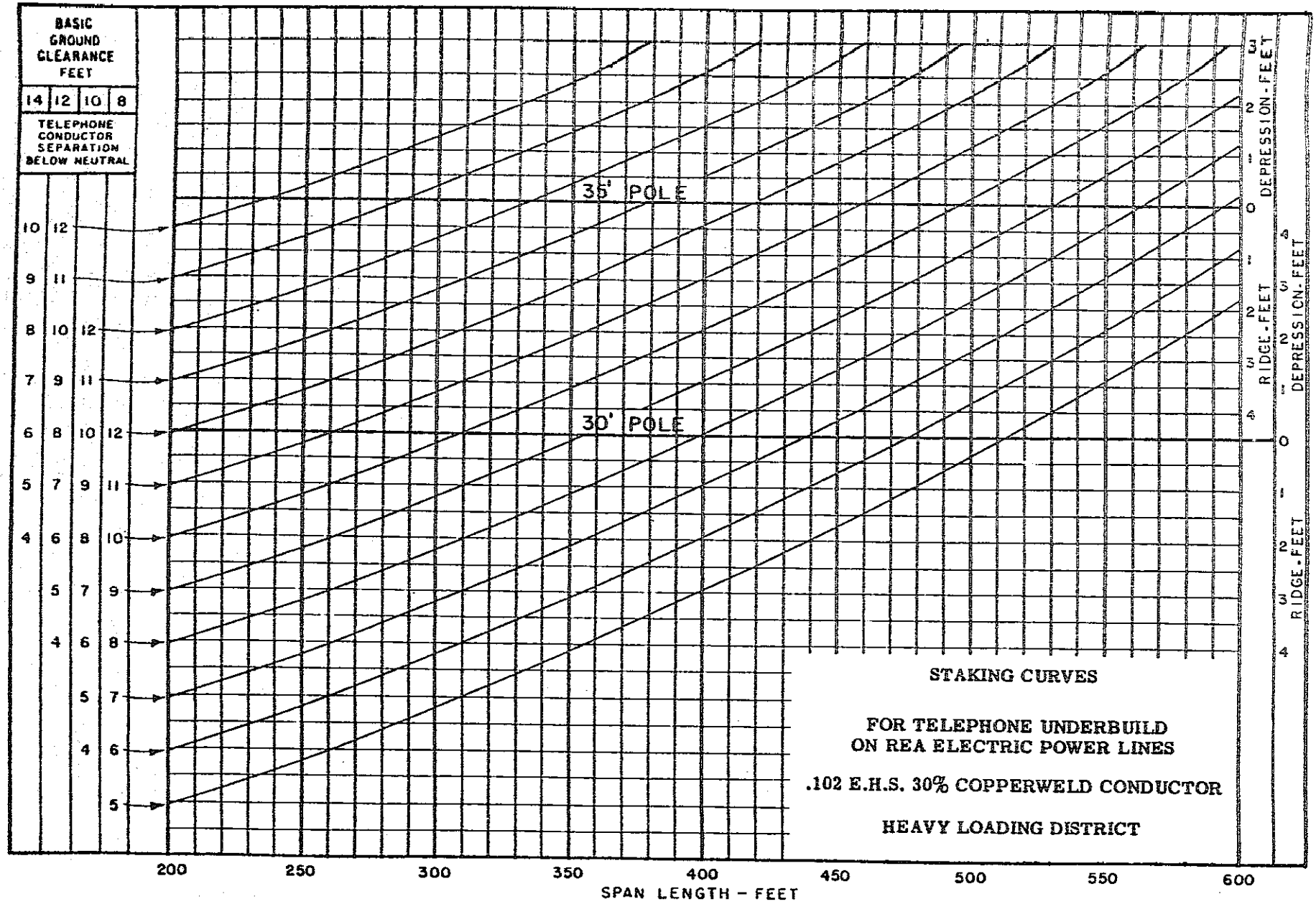
TELEPHONE CONDUCTOR: .109 Grade 135 Steel

SPAN LENGTH FT.	MINIMUM SEPARATION AT POLE BETWEEN POWER NEUTRAL AND TELEPHONE CONDUCTORS (Feet)									
	All RULING SPANS		RULING SPAN		RULING SPAN		RULING SPAN		RULING SPAN	
	LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.		LOWER POWER COND.	
	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY	NEUTRAL	SECONDARY
200										
210										
220										
230										
240										
250										
260										
270										
280										
290										
300	3.5'	6.5'								
310	"	"								
320	"	"								
330	"	"								
340	"	"								
350	"	"								
360	"	"								
370	"	"								
380	"	"								
390	"	"								
400	"	"								
410	"	"								
420	"	"								
430	"	"								
440	"	"								
450	"	"								
460	"	"								
470	"	"								
480	"	"								
490	"	"								
500	"	"								
510	"	"								
520	"	"								
530	"	"								
540	"	"								
550	"	"								
560	"	"								
570	"	"								
580	"	"								
590	"	"								
600										

NOTES: The data shown in this table reflect the following basic minimum requirements:

1. 40-inch minimum separation at pole between neutral or secondary and highest telephone conductor. (These tables do not include any consideration of minimum separation requirements when power equipment is mounted on pole below the neutral).
2. 30-inch minimum midspan separation between highest telephone conductor and neutral or secondaries.
3. Line of sight rule when secondaries up to 750 volts are involved.
4. All separations are based on REA pole head configurations with neutral 3½ feet below pole top and phase wires occupying a position at top of pole and lowest secondary 3 feet below neutral.

RD-Fig. No. 53


BASIC GROUND CLEARANCE FEET
14 12 10 8
TELEPHONE CONDUCTOR SEPARATION BELOW NEUTRAL
10 12
9 11
8 10 12
7 9 11
6 8 10 12
5 7 9 11
4 6 8 10
5 7 9
4 6 8
5 7
4 6
5
35' POLE
30' POLE
RIDGE-FEET
DEPRESSION-FEET
RIDGE-FEET
DEPRESSION-FEET
STAKING CURVES
FOR TELEPHONE UNDERBUILD
ON REA ELECTRIC POWER LINES
.102 E.H.S. 30% COPPERWELD CONDUCTOR
HEAVY LOADING DISTRICT
200 250 300 350 400 450 500 550 600
SPAN LENGTH - FEET

RD-Fig. No. 54